Public Health Reports

VOLUME 56 MAY 9, 1941 NUMBER 19

IN THIS ISSUE

FEDERAL SECURITY AGENCY

UNITED STATES PUBLIC HEALTH SERVICE

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1941

For sale by the Superintendent of Documents, Washington, D. C.

Price 5 cents. Subscription price $2.50 a year

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PREVALENCE OF DISEASE

Public Health Reports

Vol. 56 • MAY 9, 1941 • *No. 19*

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

March 23–April 19, 1941

The accompanying table summarizes the prevalence of nine important communicable diseases, based on weekly telegraphic reports from State health departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of disease." The table gives the number of cases of these diseases for the 4-week period ended April 19, 1941, the number reported for the corresponding period in 1940, and the median number for the years 1936–40.

DISEASES ABOVE MEDIAN PREVALENCE

Influenza.—While the incidence of influenza decreased almost 50 percent during the 4 weeks ended April 19, the number of cases (17,745) was about 40 percent above the number recorded for the corresponding period in 1940, and about 30 percent above the 1936–40 median incidence for this period. The current excess was due largely to the relatively high incidence in the South Atlantic and West South Central regions. There were minor excesses in the Middle Atlantic, Mountain, and Pacific regions, but in the New England, North Central, and East South Central regions the incidence had dropped below the expected seasonal incidence.

Measles.—The number of cases of measles rose from approximately 156,000 during the 4 weeks ended March 22 to approximately 219,000 during the 4 weeks ended April 19. The current incidence is the highest on record for this period. In 1938, 1935, and 1934, other years in which measles was epidemic, the cases for the corresponding period totaled approximately 149,000, 143,000, and 132,000 respectively. The average for this period for nonepidemic years is about 45,000 cases. In the New England and Pacific regions the incidence was relatively low and the Mountain region reported only about a 20-percent increase over the normal seasonal incidence, but all other regions reported very significant increases. In the East North Central region the number of cases (77,544) was more than 17

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times the 1936–40 median; in the East South Central region the incidence (12,154 cases) was more than 9 times the average incidence; the South Atlantic region reported more than 5 times the expected incidence; the other regions reported minor excesses.

Poliomyelitis.—The number of cases of poliomyelitis (75) was about 20 percent in excess of the number reported in 1940, but it was only slightly above the seasonal expectancy. The 14 cases reported from Florida were mostly responsible for a significant increase over the normal incidence in the South Atlantic region, but in all other regions the situation compared very favorably with the average of preceding years.

Number of reported cases of 9 communicable diseases in the United States during the 4-week period Mar. 23–Apr. 19, 1941, the number for the corresponding period in 1940, and the median number of cases reported for the corresponding period 1936–40

Division	Current period	1940	5-year median	Current period	1940	5-year median	Current period	1940	5-year median
	Diphtheria			Influenza[1]			Measles[2]		
United States	1,104	1,055	1,601	17,745	12,584	14,019	218,982	38,323	49,742
New England	37	24	32	27	30	58	4,929	5,463	6,609
Middle Atlantic	155	175	336	154	92	125	67,213	5,670	17,035
East North Central	202	142	317	976	1,074	1,176	77,544	4,069	4,456
West North Central	82	83	122	303	169	577	7,225	4,354	4,354
South Atlantic	176	235	265	5,060	4,240	4,240	34,209	2,469	6,677
East South Central	88	86	103	1,887	1,262	2,400	12,154	1,280	1,280
West South Central	210	152	203	7,321	4,543	4,543	8,672	3,936	3,459
Mountain	70	66	64	706	663	663	3,832	3,291	3,291
Pacific	84	92	100	1,311	511	1,232	3,206	7,791	7,791
	Meningococcus meningitis			Poliomyelitis			Scarlet fever		
United States	225	157	275	75	64	71	16,960	20,480	22,129
New England	14	4	15	3	0	1	1,253	1,304	1,829
Middle Atlantic	52	45	52	3	4	8	5,470	7,377	7,377
East North Central	25	16	35	10	9	9	5,632	7,429	7,429
West North Central	8	8	19	6	5	5	1,245	1,158	2,823
South Atlantic	56	27	54	24	10	10	871	846	871
East South Central	41	24	62	9	6	7	1,084	813	416
West South Central	16	22	22	10	11	11	374	281	619
Mountain	2	2	9	4	7	4	451	494	619
Pacific	11	9	12	6	12	12	580	778	1,079
	Smallpox			Typhoid and paratyphoid fever			Whooping cough[2]		
United States	146	277	1,267	291	339	443	18,695	13,592	[3]14,592
New England	0	0	0	12	14	20	1,291	1,024	1,024
Middle Atlantic	0	0	0	47	61	61	3,016	3,276	3,423
East North Central	57	37	321	25	50	50	3,705	2,286	2,794
West North Central	48	129	558	8	24	19	1,593	443	443
South Atlantic	8	6	6	94	43	81	3,081	1,942	2,265
East South Central	0	18	18	23	48	48	748	636	513
West South Central	19	33	44	50	51	112	1,596	1,399	1,399
Mountain	0	39	91	12	25	15	1,122	864	864
Pacific	14	15	114	20	23	30	2,543	1,722	1,722

[1] Mississippi, New York, and Pennsylvania excluded; New York City included.
[2] Mississippi excluded.
[3] 3-year (1938–40) median.

Whooping cough.—The incidence of whooping cough was also relatively high. Each region except the Middle Atlantic reported an excess over the 1938–40 median incidence. The greatest excesses were reported from the North Central, South Atlantic, and Pacific regions.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—The incidence of diphtheria was slightly higher than during the corresponding period in 1940, but the number of cases (1,104) reported for the 4 weeks ended April 19 was only about 70 percent of the 1936–40 median figure for this period. The East North Central and West South Central regions reported considerable increases over last year, and a 50-percent increase was reported in the New England region, but only the New England, West South Central, and Mountain regions reported excesses over the preceding 5-year median incidence.

Meningococcus meningitis.—The number of reported cases of meningococcus meningitis was 225, as compared with 157, 176, and 275 for the corresponding period in 1940, 1939, and 1938, respectively. The incidence was approximately 40 percent above that of last year, but it was about 20 percent below the average seasonal incidence. Pennsylvania reported 29 cases; New York and Mississippi, 18 each; Virginia, 16; Maryland, 12; and Michigan, 10 cases. More than 45 percent of the total cases were reported from those six States.

Scarlet fever.—The incidence of scarlet fever reached a new low level for this period. The total number of cases (16,960) was less than 80 percent of the number recorded for the corresponding period in 1940 and approximately 75 percent of the median expectancy for the period. Kentucky, with 605 cases, and Tennessee, with 397 cases, seemed mostly responsible for an excess of cases in the East South Central region, the only region reporting an excess over the 1936–40 median incidence for this period.

Smallpox.—The number of cases (146) of smallpox reported for the current period was also relatively low, being only about 50 percent of the record low level established for this period in 1940, when a total of 277 cases was reported. The situation was favorable in all sections of the country.

Typhoid fever.—The incidence of typhoid fever also reached a new low level, the current incidence (291 cases) being the lowest recorded for this period in the 13 years for which these data are available. The South Atlantic region reported a slightly higher incidence than might normally be expected, but in all other regions the incidence was relatively low.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the 4 weeks ended April 19, based on data received from the Bureau of the Census, was 12.0 per 1,000 inhabitants (annual basis). The rate for the corresponding period in 1941 was 12.3 and the 1938–40 average rate was 12.4.

SPECIAL PROBLEMS IN OUR HEALTH DEFENSES *

By PAUL V. MCNUTT, *Administrator, Federal Security Agency, Coordinator, Health Welfare, and Related Activities, National Defense Council*

This Conference has probably never met under graver circumstances. Under any circumstances I should be gratified to speak to this group, and, as it is, I am keenly conscious of being admitted to the inner councils of the health officers of the Nation during a time of crisis.

Our friends from the Provincial Health Authorities of Canada were never more welcome than they are this year. Not only are we glad to see them for their own sakes, but we turn to them with the interest and understanding that come from a sense of common aims and of fealty to one another in pursuing them. The manner of life in our North American household has been disrupted by the events across the way. The noise of the destruction is growing louder and more ominous. In the din and the loud voices and the threats launched at us, we have discovered that we have a way of life in which we believe and which we shall not allow to be destroyed.

I think that this Conference, which yearly marks the course of a Federal-State partnership in the cause of health, is one of the most interesting of those meeting in Washington. Though it is perhaps not old enough to be called hoary, it is certainly old enough to be described as an honored tradition. This year it is a necessity in the complex business of maintaining and increasing the Nation's health and the morale that goes with it. For within the past year health has become important to our defenses and our task has taken on complications.

In happier national circumstances I should devote the time we have together to recounting improvements in the general level of public health and professional competence. As head of the Federal Security Agency, I have followed your administrative and professional achievements. I have taken a great personal, as well as an official, interest in them, and I share your pride of accomplishment.

The times are too stern for us to linger over what has been done and to be glad. But I should like to say that I have been greatly interested in the story of the Federal-State partnership for national

*Delivered before the Annual Conference of State and Territorial Health Officers with the U. S. Public Health Service, Washington, D. C., April 29, 1941.

health and in the balance of authority which has been so nicely evolved. The partnership was entered into with the role of the Federal Government defined, by inference at least, as one of last resort. The basic Quarantine Act of 1890 carried the restriction that Federal action should be taken when the President was satisfied as to the danger of the spread of diseases across State lines. So began the combined efforts of the Federal Government and the States to fight the epidemic diseases. Each supplemented the rather meager resources of the other during what may be termed the lean years of public health. The partnership grew in its capacity for reciprocity—which is another expression for wisdom—and finally matured into a dynamic force for national health with the passage of the Social Security Act in 1935 and the Venereal Disease Control Act in 1938.

Under the perhaps guileless impression that we would be forever free to work for the good life, we nourished this partnership. Now we turn to the work of defending health on the fringes of a great world war.

There is work waiting for the health officers of this continent. As Coordinator of Health, Welfare, and Related Activities in the National Defense Council, I speak from a unique vantage point. There, I am obliged to take the wide view of our activities and our problems. I cannot make specific recommendations as to this, that, and the other thing which must be done in public health. You are the specialists. But I should like to call your attention to the immediate problems which I see from my vantage point.

Defense may be likened to a wedge. At the apex is the soldier. This is one of the stages in history when the man who does the fighting steps up as the most significant of human units. This man must have the paraphernalia of war and, as the living unit necessary to the business, he must be fed and clothed and kept in good health. The military authorities are primarily responsible for the details of his existence. They are responsible for safeguarding his health in the limited areas over which they have jurisdiction.

But a good part of the soldier's time is spent in the surrounding civil communities. Even the briefest of times could be significant, since one can pick up an infection very fast. This is where public health comes in. Last summer, in the maneuver areas, we began our task of resolving the public health problems which impartially plague both military and civil populations. Early in the fall, nine Public Health Service officers were assigned as liaison officers to the nine Army Corps Areas to facilitate the relationship between the civil and military authorities.

To solve the public health problems in environmental sanitation, food and milk sanitation, communicable disease control (especially

malaria in certain areas), and venereal disease control involves traditional public health services. This part of the work we have pretty well in hand. Money has already been provided for it and more will be forthcoming.

I might say that we started quite logically by sending experts to look into the situation. Since last fall, as you all know, the Public Health Service has had teams of physicians and engineers doing public health reconnaissance, and they have been reporting on areas where military or industrial activities have produced dangerous situations.

Trained personnel from the Public Health Service are being sent into these areas on what has been termed a "lend-lease" basis to assist in the work of our health defense.

Always during emergencies the venereal diseases step forward with the intention of complicating a bad situation. It would be ironical, now that we have developed methods of control, if we allowed them to do so in this emergency. Our efforts to control these diseases must be intensified.

As I say, these traditional services—in sanitation and communicable disease control—we have pretty well under control. And we should have, for public health has the structure and is an old hand at the work.

It seems to me, however, that there are two or three problems of grave import which are not under control. In fact, we have scarcely faced the situations realistically.

The military services are responsible for the soldier, but public health is responsible for his ally, the industrial worker. In today's war, industrial mobilization and expansion make possible military mobilization and expansion. In the speeding up of industry, our responsibilities in the field of industrial hygiene are multiplying. Able-bodied men are being mobilized into the Army, while women, young adults, and older men replace them in their jobs. These new workers make imperative increased provision for industrial hygiene activities. For all workers, new industrial processes create hazards which demand for their solution the skill of the hygienist, the toxicologist, and the industrial engineer. The significance of industrial hygiene programs in industry's expansion for national defense is far beyond what it was in 1917.

Even in more peaceful days, however, we could not claim that we had more than started this work—and here we are in a crisis that affects industry profoundly.

This is peculiarly your responsibility. Aside from those health services that may be part of accident prevention, public responsibility for protecting the health of industrial employees is vested in health departments.

The Public Health Service is throwing all the resources it can behind this work. It has expanded research in this field and directed it upon the new chemicals and mechanical problems of industrial health. A consultant nurse in industrial nursing has been added to the staff of the Division of Industrial Hygiene at the National Institute of Health. It is a pity that industrial nursing has not been given its rightful importance in the various State health departments. We anticipate catching up with this lag, however.

It is not only the occupational hazards with which health departments should concern themselves. Public health programs should provide for the worker at work, at home, and in the community. This complete consideration for the worker's health is in the pursuit of better national health through peaceful years. It is even more necessary as the efforts for defense take on momentum.

Another problem that I would bring forcibly to your attention is the old problem of medical care. What to do for those who need a doctor and have no money? How to provide hospital care for those who lack the financial "open sesame" to these institutions?

You know what is bound to happen as industrial plants expand and hang out the "employment" sign. People trek into town from all directions in search of work. When a village of 1,000 is asked to play host to many thousands, the tax structure cannot be expected to stand up to the situation.

To all defense areas there will come a large group of people who if they do not actually arrive in need will soon fall into need, through no fault of their own. Only a very small fraction of this group comes within the accepted connotation of the term "camp followers." It will include skilled or unskilled workmen, people who plan to invest their savings in small businesses, and others looking for jobs behind a counter, at a cashier's desk, or somewhere in the scheme of a boom in business.

They come and the situation happens to fail them. They do not find the jobs they expected to walk into. The businesses they open fail for some mysterious reason to "click." Or perhaps they do get along and are meeting their needs when illness strikes them or some member of their family. Then they are well into a situation they cannot manage.

We have already seen that the present national emergency is making the distribution of physicians and nurses even more unequal than it has been. Something must be done to counteract the forces doing the unequalizing. The supply of civilian medical and nursing personnel should be maintained and, if possible, increased.

As to the inadequacy of hospital facilities, that is a problem carried over from our peaceful era and due to be aggravated by the circumstances now shaping up, particularly in the defense communities.

Some of these needs we hope can be met by the so-called Community Facilities Bill now before Congress.

Closely allied to our state of health in the past and of vital importance now is the problem of nutrition. I should put this as the third important problem in our health defenses. A program to improve national nutrition would have been a necessity in continuing our quest for the good life. And we shall certainly need our nutrition in the activities that lie ahead.

The President has already called the first national conference on nutrition. When the experience and the ideas of the experts have been pooled at that conference, we can judge better in what direction we should start. At any rate, it is something to lay before this group, because this is the group that will carry much of the responsibility.

You may be assured it is the intention of the Federal Government to put all that it can into the program for health. I am hoping that the Congress will make the necessary increases in current appropriations to enhance Federal participation. Pending legislation such as the Community Facilities Bill, the May Act, and the several acts that contemplate aid to communities for hospital construction, all are of interest and merit your support. And above all it is necessary that the States continue their rightful position as leaders in our joint enterprise.

From the vantage point which I happen to occupy, I have tried to emphasize the spots in the public health scene which I think most need emphasis. The problems of industrial hygiene, of medical and hospital care, and of nutrition seem to me the most immediate. It is a relief under distressing circumstances to have something immediate on which to focus. During the week that you met last year, the Low Countries were invaded, and steadily since then a kind of anarchy has set in such as we had never dreamed of. It would take someone with more faith in his second sight than I have in mine to offer any prediction as to what lies ahead. So I am stopping with our immediate problems, which I think is suitable, for immediate problems are the sort of thing public health should be pursuing up to the very din of Armageddon.

"SPORADIC" POLIOMYELITIS

With Special Reference to the Geographical and Chronological Distribution in Tennessee in the 18 Months Ended June 30, 1940

By L. L. Lumsden, *Acting Director, Division of Preventable Diseases, Tennessee Department of Public Health*

Since the collection of morbidity reports was begun by the Tennessee Department of Public Health in 1925, cases of and deaths from poliomyelitis have been reported every year in Tennessee. In some of the years the number of deaths reported from the disease nearly equalled

and in 1 year (1925) exceeded the number of cases reported. Even though reports of deaths since the end of 1925 from counties with full-time health departments and also those from the other counties since the end of 1937 have been accepted and recorded as reports of cases, the ratio of recorded deaths to recorded cases for the whole period of 15 years suggests that (*a*) the reports of cases were far from complete, (*b*) the deaths in considerable proportion were charged incorrectly to poliomyelitis, or (*c*) the disease was unusually fatal. The records are given in table 1.

For most of these years the morbidity and mortality rates were low and the cases were widely scattered over the State. In 1936 the situation was unusual. In the summer and autumn of that year the reported incidence was comparatively high and the disease was concentrated in outbreak proportion (over 50 cases per 100,000 population) in an area comprising a single row of counties extending from the south to the north border of the State and being adjacent on the south to the area in the northwest section of Alabama and the northeast section of Mississippi in which poliomyelitis occurred coincidently in outbreak proportion.[1]

TABLE 1.—*Poliomyelitis, reported cases and deaths, with rates per 100,000 population, Tennessee, 1925–39*

Year	Number		Rate[1]		Year	Number		Rate[1]	
	Cases	Deaths	Morbidity	Mortality		Cases	Deaths	Morbidity	Mortality
1925	31	36	1.2	1.4	1933	118	35	4.4	1.3
1926	30	26	1.2	1.0	1934	61	34	2.2	1.2
1927	91	37	3.6	1.5	1935	91	28	3.3	1.0
1928	46	38	1.8	1.5	1936	385	45	13.8	1.6
1929	123	32	4.7	1.2	1937	127	30	4.5	1.1
1930	70	25	2.7	1.0	1938	39	20	1.4	.7
1931	53	24	2.0	.9	1939	34	12	1.2	.4
1932	61	20	2.3	.7					

[1] Based on population estimates made by the Tennessee Department of Public Health.

THE SITUATION IN 1939

Effort was made to obtain certain detailed data on every case reported or recorded as poliomyelitis in Tennessee during the calendar year 1939. Thirty-seven cases were recorded. Of these, 3 originally diagnosed and reported as poliomyelitis were reported after subsequent clinical observations or laboratory findings as cases of other diseases—one as tuberculous meningitis, one as neurasthenia, and one as infantile scurvy—and were removed from the official morbidity records of poliomyelitis. Some of the data collected on the 34 cases remaining on the official records are presented in table 2, the cases being numbered in the order in which detailed data regarding them were obtained.

[1] Lumsden, L. L.: Poliomyelitis, facts and fallacies. South. Med. J., 30: 465–475 (May 1938).

TABLE 2.—*Data on cases officially recorded as poliomyelitis in Tennessee in 1939*

Case No.	Race	Sex	Age, years	Residence (county or city)	Approximate date			Diagnosis made by—			After official queries and final observations diagnosis regarded	Death	Remarks
					Reported	Onset first symptoms	Paralysis	Family physician only	Family physician and local health officer	Hospital staff			
1	W	F	7	Nashville (city)	Jan. 21	Jan. 1	+Jan. 1	+			±		Onset sudden with paralysis of face and one arm and weakness of leg on same side. No systemic symptoms noted. Physician regarded diagnosis doubtful. Residence 2 miles north of capitol in poor neighborhood.
2	W	F	42	Blount	Feb. 11	1897	+1897	+			−	Jan. 3	Case recorded from death certificate giving infantile paralysis as only cause of death. Inquiry showed patient had been paralyzed since infancy and that immediate cause of death was probably myocarditis.
3	C	F	5	Lauderdale	Apr. 8	Mar. 27	±Mar. 30	+			−	Apr. 27	Diagnosis of case made after one brief observation by physician who later signed death certificate giving "lobar pneumonia" only as cause of death.
4	W	M	16	Warren	Apr. 8	(?)	+	+			±		Case reported incidentally in course of efforts to have the boy admitted to a home for crippled children. History indefinite as to time crippling began and nature of preceding illness.
5	W	F	6 months	Campbell	Apr. 17	Mar. 1	(?)	+			−	Mar. 11	Case recorded from death certificate. Reporting physician stated baby had symptoms of gastroenteritis for about 10 days and had "generalized paralysis" for a day or two before death.
6	W	M	11	Knox	May 5	Mar. 25	+Apr. 18	+			±		Reporting physician stated the illness began with upper respiratory infection that developed into a serofibrinous pleurisy. Upon noting paralysis in both legs on Apr. 18 he insisted on spinal puncture and patient was taken out of his hands.
7	C	M	3	Montgomery	May 23	Apr. 10	±Apr. 13	+			±	Apr. 19	Case recorded from death certificate. Patient had

7	C	M	3	Montgomery	May 23	Apr. 10	±Apr. 13		+		±	Apr. 19	Case recorded from death certificate. Patient had high fever and pronounced stupor throughout illness with apparently definite muscular weakness in both arms and legs 2 or 3 days after onset of illness. Neither reporting physician nor health officer made definite diagnosis of case.
8	C	F	12	Cocke	June 27	June 22	+June 23		+		+	June 26	Case seen by health officer and 4 other physicians. All concurred in diagnosis of poliomyelitis with paralysis of Landry's type.
9	C	F	19	Bedford	July 3	June 19	+June 21			+	±	June 24	Patient was admitted to hospital with respiratory paralysis. No satisfactory history of the illness prior to admission was obtainable.
10	W	M	2½	Davidson	July 8	June 26	+July 1			+	+		Home in scattered village, rather poor and insanitary neighborhood in northeast suburb of Nashville. 4 other children in family under 11 years. No other suspected case in home or neighborhood.
11	W	F	19	Chattanooga (city)	July 5	June 3	+June 5			+	+		Case seemed clinically typical. This was the only case reported in Hamilton County in 1939.
12	W	F	7	Knox	July 18	June 16	+June 28	+			+		Case seemed clinically typical. Residence 15 miles northeast of Knoxville in isolated section of county.
13	W	M	16	Unicoi	July 15	June 20	+July 14		+		±	July 17	Case was first diagnosed typhoid fever. Flaccid paralysis of left arm and leg noted 3 weeks later with bronchopneumonia and deep coma developing 3 days before death.
14	C	M	10	Williamson	July 19	June 25	+July 2			+	+		Familial contact with active cases of tuberculosis for 3 years before onset. Boy at beginning of his illness was thought to have tuberculous meningitis but after thorough hospital study his case was positively diagnosed as poliomyelitis. Home insanitary and crowded; located 18 miles southwest of Franklin. No other case found in county during 12 months after this case.
15	W	M	13	Davidson	Aug. 1	July 19	+July 22	+			+		Residence 8 miles south of Nashville in country neighborhood with good sanitary conditions. Boy had brief contact on July 8 and 10 with a man who had been traveling in Charleston County, S. C., during the several months before. 5 days before illness boy went swimming in creek near cattle crossing in northern part of Williamson County.
16	W	M	6 months	Sumner	Aug. 1	Apr. 22	—	+			−		Baby had mild upper respiratory infection with some indication of pain and a slight swelling of forearm. One of the physicians who saw the case thought arm trouble was due to mechanical injury. No spinal fluid or blood examination made. Baby entirely well when examined on July 18.
17	W	F	12	Nashville (city)	Aug 7	July 22	+July 28			+	+		Residence 3½ miles east of capitol in a rather poor, scattered residential neighborhood. Evidence of abundance of rats in immediate vicinity.

TABLE 2.—*Data on cases officially recorded as poliomyelitis in Tennessee in 1939*—Continued

Case No.	Race	Sex	Age, years	Residence (county or city)	Approximate date			Diagnosis made by—			After official queries and final observations diagnosis regarded	Death	Remarks
					Reported	Onset first symptoms	Paralysis	Family physician only	Family physician and local health officer	Hospital staff			
18	W	F	5	Davidson	Aug 8	July 10	+July 11	+			+		Residence on farm 10 miles east of Nashville. Sanitary conditions rather poor. Various kinds of livestock on premises. A day or two after onset of child's illness a hen on place was found paralyzed in 1 leg and 1 wing. Hen was killed and buried. 3 or 4 of large flock of hens had had a similar affliction during winter and spring before.
19	W	M	4	Giles	Aug. 8	July 23	±July 30		+		±	Aug. 1	Boy had malaise and perhaps slight fever for 2 days beginning July 23 and thereafter seemed entirely well until July 30 when physician saw him. Boy had temperature of 102° and weakness of right leg which was drawn up, and severe pain in appendical region. No examination of spinal fluid or blood. No other suspected case found in Giles County until January 1940.
20	W	M	22	Wilson	Aug. 28	Aug. 8	+Aug. 10			+	+		Residence 8 miles southwest of Lebanon in a remote, rugged, wooded neighborhood. Conditions of premises insanitary. House crowded. Family including 4 small children had no other recent illness. Severa hens on premises had developed a paralytic condition during the summer, 1 of them having become paralyzed in 1 wing and 1 leg on opposite sides about same time as onset of case diagnosed poliomyelitis.
21	W	M	14	Nashville (city)	Aug. 22	Aug. 11	—			+	±		Residence 1½ miles east of capitol in a poor, insanitary neighborhood, rural in character. Boy was ill for only about 1 week with slight fever and general muscular weakness. When examined thoroughly on Sept. 6 he was pale, poorly nourished, with flabby musculature but no evidence of paralysis or localized muscular weakness.

22	W	M	3	do	Aug. 22	July 3	+July 5			+	+		Residence about 4 miles west of capitol in a poor village neighborhood with sanitary conditions generally poor.
23	C	M	3	Sumner	Aug. 29	July 5	±July 8		+		±		The boy had soreness and weakness in legs and back following an attack of stomachache of 2 or 3 days' duration. 21 days after onset of illness he appeared well except for slight weakness in left leg. Encephalomyelitis was suspected but physicians who examined the case thought it more likely poliomyelitis.
24	W	M	1½	Cocke	Sept. 5	Aug. 12	+Aug. 12		+		+	Aug. 16	Diagnosis supported by autopsy finding of histopathology typical of poliomyelitis of medulla and upper spinal cord. Clinical course was that of bulbar and spinal type of poliomyelitis. 6 in family including 3 other children under 10. All had been under treatment for syphilis since December 1938. Home in isolated rural neighborhood with poor sanitary conditions.
25	W	M	1¼	Wilson	Sept. 5	Aug. 28	±Aug. 30	+			+		Child had measles in June 1939. Sister aged 5 had slight sore throat at the time of onset of this child's illness. Fever continued for about a week and was followed by weakness but not definite paralysis of both legs and back. Residence, excellent country home, 2 miles east of Lebanon. 3 chickens on premises became lame about same time boy became ill. 1 of them demonstrated to have fowl neurolymphomatosis with tumor of sciatic nerve.
26	W	M	19	Robertson	Sept. 2	Aug. 24	±Aug. 31	+			−	Sept. 10	A few days after family physician diagnosed and reported the case as poliomyelitis, patient was admitted to a hospital in Nashville where a definite diagnosis of tuberculous meningitis was made. Death certificate issued by hospital gave tuberculous meningitis as cause of death and miliary tuberculosis as contributory.
27	W	F	4	Hardin	Sept. 11	Aug. 30	±Sept. 4		+		±		No paralysis but definite localized muscular weakness with fever continuous from Aug. 30 to Sept. 22. Systemic symptoms strongly suggestive of poliomyelitis. Residence in isolated rural neighborhood, 20 miles southeast of Savannah. No other cases suspected to be poliomyelitis in county during the year.
28	W	F	5	Sumner	Sept. 12	Aug. 23	+Aug. 29	+			+		Local health officer concurred in diagnosis of clinical poliomyelitis. No examination of spinal fluid or blood. Home in isolated, rural neighborhood 25 miles from Gallatin.
29	W	M	4	Blount	do	Sept. 1	+Sept. 2		+		+		Case clinically poliomyelitis. No examination of spinal fluid or blood made. Home in rural neighborhood 6 miles northeast of Maryville. 9 in family, 5 under 10 years. Living conditions poor. Small unscreened frame dwelling. No other case diagnosed or suspected to be poliomyelitis in county during year except No. 2 in this table.

TABLE 2.—*Data on cases officially recorded as poliomyelitis in Tennessee in 1939*—Continued

Case No.	Race	Sex	Age, years	Residence (county or city)	Approximate date			Diagnosis made by—			After official queries and final observations diagnosis regarded	Death	Remarks
					Reported	Onset first symptoms	Paralysis	Family physician only	Family physician and local health officer	Hospital staff			
30	C	M	10 months	Madison	July 20	Jan. 1	(?)	+			−	Jan. 7	Case recorded from death certificate received in July. Reporting physician saw patient once a few hours before death. No history given to indicate nature of illness prior to that time.
31	W	F	2	Unicoi	Oct. 14	Oct. 10	+Oct. 12		+		+		Clinical signs and symptoms strongly suggestive of poliomyelitis. No examination of spinal fluid or blood made.
32	W	M	10	do	Oct. 23	Oct. 18	+Oct. 19		+		+		Clinical signs and symptoms strongly suggestive of poliomyelitis. No examination of spinal fluid or blood made. This boy played with brother of baby with case No. 31. The 2 homes are in the same immediate vicinity in a suburb of Erwin.
33	C	F	2	Lauderdale	Nov. 18	Nov. 8	+Nov. 16		+		±		Child was not seen by any physician during her systemic illness. History obtained from family was vague and indefinite but not so far as it went suggestive of poliomyelitis. Medical examination in January 1940 found "marked weakness below hips, atrophy of muscles and flaccid paralysis, left leg more marked than right."
34	W	M	1½	Henry	Dec. 2	do	+Nov. 12	+			+		Symptoms and signs clinically strongly suggestive of poliomyelitis. No examination of spinal fluid or blood made. 3 other children under 10 years of age in family. None of the others had any illness suggesting poliomyelitis.

Three of the 12 deaths charged to poliomyelitis in the mortality records for 1939 are not reflected in the morbidity reports because two of them were of nonresidents admitted to hospitals within the State after development of the illness outside the State and one (occurring in Sevier County in June) was regarded from the data given in the delayed death certificate as not having been caused by a recent attack of poliomyelitis but as having been due essentially to other causes.

Age, sex, and race distribution.—The distribution by age, sex, and race of the persons affected is shown in the following table:

Age, years	White		Colored		Total
	Male	Female	Male	Female	
Under 5	8	3	3	1	15
5–9	0	4	0	1	5
10–14	4	1	1	1	7
15–19	3	1	0	1	5
20 and over	1	1	0	0	2
Total	16	10	4	4	34

Reporting of cases.—Of the 34 cases, 20 were reported by attending private physicians, 4 by local health officers, 6 by hospital staffs, and 4 not reported as cases were recorded from data given in death certificates. Reports of cases from family physicians or hospital staffs in areas with full-time local health service went to local health departments and thence were transmitted to the State Department of Public Health, while in other areas such reports went direct to the State Department of Public Health. How many cases, if any, with clinical manifestations warranting a diagnosis or at least a suspicion of poliomyelitis occurred and were not reported is a matter of speculation. There is no evidence that the number of such cases was considerable. In the more populous counties with one or more cases reported, intensive observations and inquiries by the local health departments and other agencies continuing for months after the occurrence of each of the reported cases failed to discover any additional case.

Diagnosis.—Since in epidemiological studies data collected on cases reported under erroneous diagnoses are positively misleading, the basis for the diagnosis of each of the cases reported was ascertained to the fullest extent practicable. In 15 of the cases the diagnosis prior to official reporting was made by the family physician only, in 11 by the family physician and the local health officer, and in 8 by a hospital staff. The procedures of the Division of Preventable Diseases in checking on diagnoses included (*a*) querying attending physicians and/or local health officers (in all cases) for details regarding clinical manifestations and laboratory findings, (*b*) visits to the homes

of some (13) of the patients to observe clinical manifestations or to obtain clinical histories and to secure specimens for laboratory examination, and (*c*) review of laboratory findings in 16 of the cases and of autopsy findings in one. In some instances the local health officer did not concur in the diagnosis made by the attending physician, but in such instances the case remained in the official records as poliomyelitis unless the attending physician saw fit to change the diagnosis and to report the change. From all of the data obtained by the various procedures of investigation, the preponderance of evidence appears to warrant the opinion that of the 34 cases the diagnosis almost certainly was erroneous for 6, more or less doubtful for 11, and correct

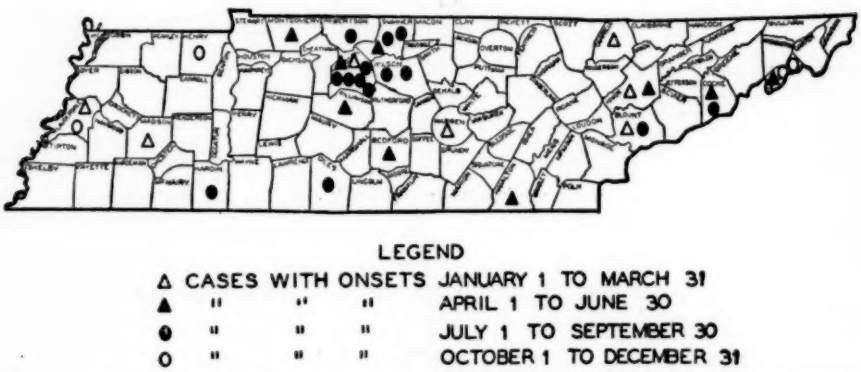

FIGURE 1.—Cases reported and/or recorded as poliomyelitis in Tennessee in 1939, by season of occurrence. Total=34.

(or fully justified by clinical manifestations along with the findings from such laboratory examinations as were made) for 17.

Geographical and chronological distribution.—Figure 1 shows the distribution, by season and by county of residence, of the cases reported in 1939 and retained in the official records of poliomyelitis. The cases were reported from 19 of the 95 counties of the State. Of the counties with reported cases, some are in the westernmost, some in the easternmost, some on the southern border, and some on the northern border of the State, with considerable stretches of country between them as a rule. One of the counties had 7 cases, 2 had 3 cases each, 5 had 2 cases each, and 11 had 1 case each. The nearest approach to concentration was in a group of 3 contiguous counties, Davidson, Sumner, and Wilson, in the north central part of the State. In this area, however, the incidence was only 1 case to about 24,000 population. Of the 7 cases in Davidson County, 4 were in the city of Nashville and 3 were in widely separated rural areas of the county in 3 different directions from the city. The residences at which the 4 cases in Nashville occurred were in 4 different suburbs of the city, no two being within 2 miles of each other. The approximate dates of

onset of the cases in these 3 counties were as follows: In Davidson, January 1, June 26, July 3, 10, 19, and 22, and August 11; in Sumner, April 22, July 5, and August 23; in Wilson, August 8 and 28. The cases in Sumner County were in 3 different neighborhoods. The 2 cases in Wilson County were in homes about 10 miles apart in open country neighborhoods, one 2 miles east and one 8 miles west of the city of Lebanon. In the other counties with 2 or more cases the onsets were, in Lauderdale, March 27 and November 8; in Knox, March 25 and June 16; in Cocke, June 22 and August 12; in Unicoi, June 20 and October 10 and 18.

In the affected areas of the State generally no evidence whatsoever was found of a causal connection between cases or of a common source of infection. The only exception to this rule was in Unicoi County where two cases with onsets 8 days apart (in October) developed in two closely associated families living in the same suburban section of the town of Erwin. The district health officer in reporting on October 23, 1939, the second of these two cases stated "This may be the onset of an epidemic." However, no additional case either diagnosed or suspected was found in Unicoi County and reported in the following 9 months.

It is interesting to note that in most instances in which two or more cases occurred in a county or a general vicinity the interval between the onset of the first case and that of the second was over 6 weeks. The interval between the onsets of the two cases in Cocke County, both with clinical manifestations thoroughly warranting the diagnosis and one of them with supporting evidence furnished by autopsy findings, was from June 22 to August 12.

The majority of the cases occurred in open country homes where generally conditions were insanitary with respect to water supplies, excreta disposal, and exposure to insects, and where poultry and other domestic animals were kept on the immediate or nearby premises.

In the 6 largest urban centers, Jackson, Johnson City, Knoxville, Chattanooga, Nashville, and Memphis, with populations ranging from about 22,000 to 255,000 and aggregating about 680,000, only 5 of the reported cases presumably of local origin occurred—4 in Nashville and 1 in Chattanooga. Thus, the incidence in the main urban areas of the State was only 1 case to about 136,000 population.

Deaths.—Of the 34 persons having illnesses recorded as poliomyelitis, 11 died within a few weeks after the onset of the illness. The causes of death as given in the death certificates were poliomyelitis or infantile paralysis for 9, lobar pneumonia for 1, and tuberculous meningitis for 1. Of the 8 cases recorded in the first 6 months of the year, 5 died.

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THE SITUATION FROM JANUARY 1 TO JUNE 30, 1940 [2]

In this period 8 cases were reported as poliomyelitis, 1 in Giles County and 1 in Obion County for the week ended February 17, 1 in Hardin County for the week ended April 6, 1 in Trousdale County for the week ended April 13, and 4 in Shelby County, 3 for the week ended June 8 and 1 for the week ended June 15. Thus the incidence of reported cases in this period was diffused in widely separated areas in the middle and western sections of the State.

Information obtained subsequent to the receipt of the first reports of the cases was (1) that the Hardin County case was found by autopsy to be a case of malignant medulloblastoma in the cervical portion of the spinal cord, (2) that the Trousdale County case was "chronic," and (3) that 3 of the Shelby County cases had been reported through clerical error in the course of a tabulation of old records of crippled children. Of the 3 cases with clinical manifestations and courses appearing to warrant the diagnoses and which are retained in the official morbidity records of poliomyelitis for the first 6 months of 1940, 1 developed in an isolated country home in Giles County about December 28, 1939, 1 in an isolated country home in Obion County about January 28, 1940, and 1 in a village home in Shelby County about May 4, 1940.

DISCUSSION

The data collected in the course of this study are obviously fragmentary, but they are sufficient to indicate some of the features of what appears to be a fairly typical poliomyelitis situation with a low rate of incidence widely and irregularly distributed over a large area. Erroneous or highly questionable diagnosis in a considerable proportion (over 30 percent) of the cases was a conspicuous feature. The meagerness of evidence of either direct or indirect connection between the cases was another.

[2] Since this report was written, studies have been made of the 45 cases reported as poliomyelitis in Tennessee for the period July 1 to December 31, 1940, and retained on the morbidity records. These cases occurred in 19 counties, all of which, except Shelby with 2 cases and Fayette with 1, are in the northern half of the State. Five or more were reported in each of 3 counties, 2 in each of 5 counties, and 1 in each of 11 counties. There was a concentration in the eastern end of the State with 12 cases in Johnson County, 7 in Greene, and 5 in Washington. In the 6 Tennessee counties adjacent to 1 or the other of these 3 counties, there was a total of only 4 reported cases. In 6 of the cases reported in Greene and Washington Counties the diagnosis appeared doubtful.

The situation in Johnson County was the nearest approach to an outbreak in Tennessee since 1936. Ten of the 12 cases were in the open country, in quite isolated homes scattered in a rugged valley area about 20 miles in length north and south, and averaging about 2 or 3 miles in width with Mountain City near its center. It is estimated that this area, exclusive of Mountain City, has a population of about 1,200. In Mountain City, with a population of about 1,100, not a case was reported. The clinical diagnosis in each of these 10 cases appeared thoroughly warranted. Not more than one case developed in any of the homes. Of the affected homes, 6 are from 1 to 10 miles south, and 4 from 1 to 8 miles north of Mountain City. Not a trace of evidence was found by searching inquiry of direct or indirect personal contact between any two of the affected families. Of the cases, 6 had onset of illness between July 28 and August 20, 1 on September 1, and 3 between October 6 and October 24.

The distribution in its diffusion and unpredictability seemed somewhat comparable even to that of lightning stroke. While a few "sporadic" cases were occurring in widely separated places in Tennessee, outbreaks of high intensity were occurring in Charleston County and Floyd County in the neighboring States of South Carolina and Kentucky, respectively.[3] The differences in epidemiological behavior of the disease or the diseases called poliomyelitis in different neighboring areas in the same period of time or in the same area in different periods of time gives cause for questioning a causal identity. If one specific virus is an etiological constant in all of the epidemiological varieties other causative factors must operate variably.

The distribution of the cases officially recorded as poliomyelitis in Tennessee during the period from January 1, 1939, to June 30, 1940, is not satisfactorily explicable on an epidemiological basis of practical

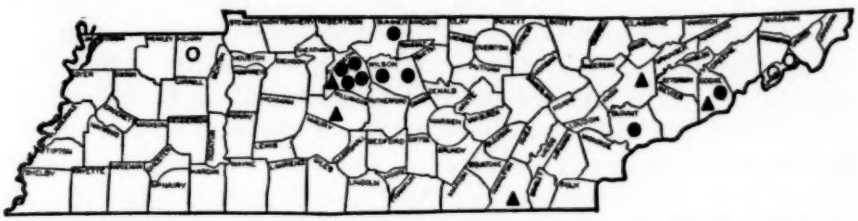

FIGURE 2.—Reported cases of poliomyelitis in Tennessee in 1939 (by seasons, as indicated in figure 1) in which the diagnoses appeared well established by all of the clinical manifestations. Total=17.

probability. If the cases in which the diagnoses seem definitely erroneous or doubtful are eliminated from the picture the problem is not lessened essentially (see fig. 2). The findings appear to eliminate beyond reasonable doubt direct personal contact between cases with pathognomonic or suggestive symptoms as a considerable factor but they do not eliminate the possibility either of spread of infection by human carriers or of infection harbored by lower animals and conveyed from them to persons through insect transmission or otherwise. If the disease was caused by infection spread entirely or largely in the nasopharyngeal secretions or alvine discharges of human carriers, the carriers, whether few or many, must have had a wide range of distribution over the State from time to time during the 18 months, disseminating the infection either to only a few persons in widely separated places or to many persons in large populous communities among whom there happened to be at the time a very small proportion susceptible to the manifest disease. It is also apparent that if the disease was caused by infection harbored by lower animals and transmitted from them to persons by biting or stinging insects the reservoirs and the vectors must have had a wide and spotty range of effective operation.

[3] Dauer, C. C.: Prevalence of poliomyelitis in the United States in 1939. Pub. Health Rep., 55: 955-961 (1940).

It is interesting in puzzling over the problem of poliomyelitis distribution to consider the elements of mystery in the distributions of other diseases for which scientific knowledge regarding the causation or mode of spread is generally regarded as well established.

Even smallpox, a classical example of the diseases classified as contagious, presents at times epidemiological manifestations suggesting the operation of some unknown factor or factors in its causation or spread. Tennessee furnished such an instance in 1939. The distribution of the total of 283 reported cases was confined to 16 counties which are scattered in different regions of the State. In only 6 counties were more than 5 cases reported—10 in Warren, 12 in Gibson, 15 in Crockett, 23 in Van Buren, 25 in Madison, and 179 in White. The limited distribution did not appear to be due entirely to control measures because in some of the areas with a few cases a large proportion of the population remained unvaccinated and the control measures (such as isolation of patients and vaccination of immediate contacts) were not applied early enough or on a sufficient scale to have much effect. The high incidence in White County was concentrated in and within a radius of about a mile of the county-seat town of Sparta and was largely confined to that area. Scattered cases had occurred in the county during the several months preceding the outbreak in May. Less than 10 percent of the county's population had ever been vaccinated before the outbreak. Effective control measures were not inaugurated before the outbreak had passed its height as measured by the probable dates of infection of the cases. Why the outbreak did not occur earlier in the year and why the disease did not spread in outbreak proportion throughout the county and the neighboring counties whose populations also were very largely unprotected by vaccination cannot be explained satisfactorily with our present knowledge of smallpox.

The markedly higher morbidity and mortality from diphtheria among children under 5 years of age in the east Tennessee counties than among those in the middle and west Tennessee counties [4] cannot be explained satisfactorily by difference in extent, degree, and kind of artificial immunization, and of other public health procedures and seems to be due to the operation of some factor or factors not yet determined.

Figures 3, 4, 5, and 6 show the distribution of reported cases of Rocky Mountain spotted fever, tularemia, meningococcus meningitis, and tetanus, respectively, in Tennessee in 1939. There is, of course, no known reason to suspect a causal relationship between or a specific etiologic factor common to any of these diseases and poliomyelitis. Yet if allowance is made for the difference in numbers of cases, the distributions show some interesting general similarities. The scattered

[4] Sanford, W. V., Puffer, Ruth R., Tucker, C. B., and Hardison, A. E.: Diphtheria in Tennessee. South. Med. J., 33: 321-327 (March 1940).

distribution of the Rocky Mountain spotted fever cases is strikingly similar to that of poliomyelitis. The same would hold for tularemia if the cases were eliminated which occurred among market workers and other persons in urban centers who contracted the infection from rabbits transported after death from their native habitats. The

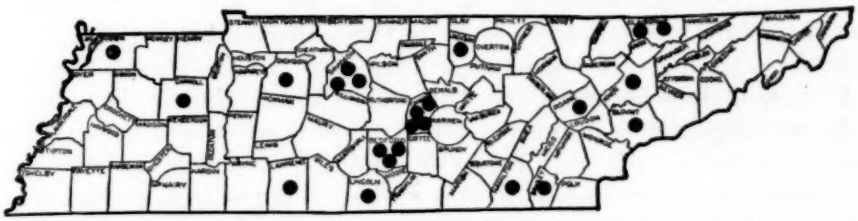

FIGURE 3.—Reported cases of Rocky Mountain spotted fever (eastern type) in Tennessee in 1939. Total=23

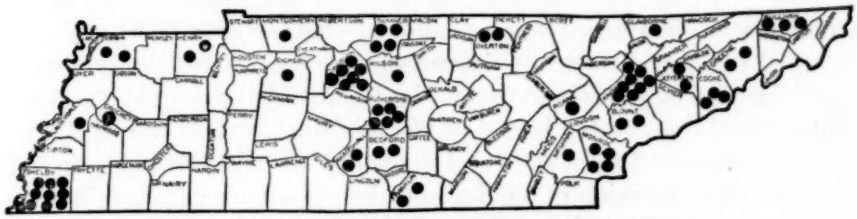

FIGURE 4.—Reported cases of tularemia in Tennessee in 1939. Total=70.

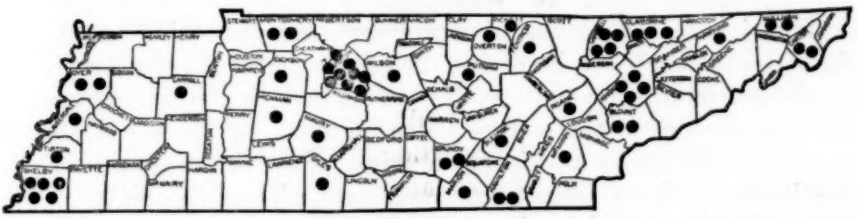

FIGURE 5.—Reported cases of meningococcus meningitis in Tennessee in 1939. Total=56.

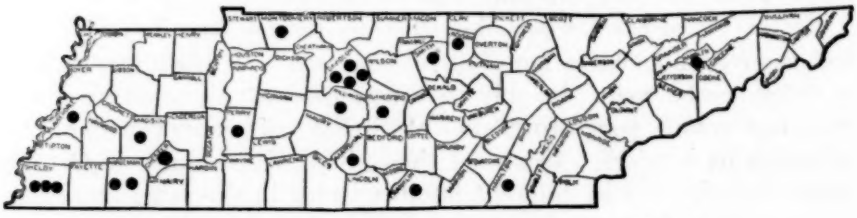

FIGURE 6.—Reported cases of tetanus in Tennessee in 1939. Total=22.

meningitis cases show a somewhat contrasting tendency to concentration in the urban regions. The distribution of the tetanus cases, if taken alone, would appear to suggest about as much as does that of poliomyelitis a spread of the infection by personal contact.

This comparison of distributions of different unrelated diseases is made to indicate the importance of thorough open-mindedness in epidemiological studies of the unsolved problem of poliomyelitis

causation. In the recent study of the problem in Tennessee consideration was given constantly to contagion, to animal harborage and insect transmission, and to every other conceivable source-spread possibility. Every trail even remotely suggestive was pursued but none led far enough to be impressive.

One of the trails which was of special interest for a while was found in the course of consecutive visits to three affected homes, one in the southeastern part of Davidson County and two in Wilson County. At each of these homes at about the same time as the development of the poliomyelitis case some (about 2 percent) of the chickens on the premises had manifested a paralytic condition involving legs or wings, or both. In some cases a leg and a wing on opposite sides, in others a leg and wing on the same side, and in others both legs were affected. A number of homes in each of the affected neighborhoods in Wilson County were canvassed but at none of them except those with the cases of poliomyelitis was evidence obtained of recent occurrence of paralysis among the chickens on the immediate or nearby premises. From one of the affected homes in Wilson County a half-grown chicken recently recovered from the paralysis and a hen with definite paralysis of a few days duration of one leg and the opposite wing were taken to the Division of Pathology of Vanderbilt University for examination. The findings in the chicken were negative. Those in the hen showed pathological manifestations of neurolymphomatosis including a tumor the size of a small pea involving the sciatic nerve of the affected leg. In obtaining data on poliomyelitis cases investigated subsequent to the observations at these three homes specific inquiry was made but in no other instance was evidence obtained of concurrent fowl paralysis and human poliomyelitis at the same home. Thus the chicken paralysis trail did not lead far, but it did lead as far as any other epidemiological trail found in the course of this study.

No two of the cases occurred in the same household. In no instance was there even a suggestion of direct conveyance of the infection from the sick to the well. In only two instances was there any concrete evidence found suggesting the possibility of conveyance of the infection by carriers. In one of these, in Unicoi County in October 1939, two children in different families living in the same immediate vicinity had onsets of illness 8 days apart and in this interval the second child to be affected had played with a well child of the first family, but away from the home of the child first stricken. It appears that in this instance the possibility of a common source of the infection cannot be eliminated. The other instance was in Davidson County in July 1939. A child in a family living in a home with good hygienic conditions became ill 11 days after a social visit of a few hours to the home by a man who during the several weeks before had been traveling on business in the vicinity of Charleston, S. C., where poliomyelitis

then was prevalent. The visitor had had no recent indication of illness.

The evidence obtained by this study is mainly negative; but, as such negative evidence has a value in epidemiology, it may be useful for consideration in future studies. In the face of all of the evidence yet obtained a question might be raised as to whether there has been in Tennessee since 1936 a single case of poliomyelitis etiologically identical with that which occurs at times in the United States in outbreak or epidemic form. Even in the Cocke County case in which the clinical diagnosis was supported by autopsy findings no determination was made of the nature of whatever virus, if any, was in the pathological picture.

CONCLUSION

Intensive and extensive systematic studies of "sporadic" poliomyelitis situations as well as of localized outbreaks and of widespread epidemics of the disease would be of epidemiological value and a definite program of such studies should be formulated and carried out by State, Federal, and other centralized public health agencies. Such studies would be likely to reveal a considerable proportion of erroneous diagnoses, especially in nonepidemic seasons.

A CLINICAL STUDY OF POLIOMYELITIS IN CHARLESTON COUNTY, SOUTH CAROLINA, 1939 [1]

By DORLAND J. DAVIS, *Assistant Surgeon*, FRANCIS J. WEBER, *Assistant Surgeon, United States Public Health Service*, and MARGARET S. ARBY, R. N., *Orthopedic Consultant Nurse, County Department of Health, Charleston, S. C.*

During the year 1939, an unusually large number of cases of poliomyelitis was reported to the State Board of Health of South Carolina. The disease was prevalent throughout the State and was of epidemic proportions in Charleston County, which had an attack rate of 130 paralytic cases per 100,000 population compared with a rate of about 15 per 100,000 for the remainder of the State. While the other county rates varied considerably, no county had a rate approaching that of Charleston, and the disease was not unusually prevalent in surrounding States. A more strictly epidemiological description of the epidemic in South Carolina and in Charleston County will be the subject of another report.

The purpose of this study is to describe the clinical characteristics of the acute disease as it appeared in Charleston County [2] and to

[1] From the Division of Infectious Diseases, National Institute of Health, and the Charleston County Department of Health, Charleston, S. C.

[2] Charleston County has an area of 923 square miles of which 43 square miles are coastal marshland. The provisional figures of the 1940 Census list the county as having a population of 121,006, of whom 70,689 (58.4 percent) live in the city of Charleston.

present a summary of the convalescent progress from an orthopedic standpoint of all persons known to be affected by the disease at least 1 year after the onset of illness. The availability of trained personnel and adequate facilities for orthopedic care, which were organized in Charleston County to meet the epidemic need, afforded an unusual opportunity to make such a study.

Poliomyelitis has occurred sporadically in the district previously, but the epidemic of 1939 was the largest ever recorded in this area. A total of 196 cases, 159 paralytic and 37 nonparalytic, was reported to the Charleston County Department of Health as having had onset between October 1938 and December 1939. The first case occurred in the city of Charleston on October 29, 1938, and others appeared occasionally until April 1939, when there was a decided increase in incidence throughout the entire county. The first week of May marked the peak of the epidemic. Subsequently, the number of cases per week decreased rather slowly, and the outbreak had definitely ceased by September 20, only 4 sporadic cases occurring during the remainder of the year.

The distribution of the paralytic and nonparalytic cases by color and age is shown in table 1. Seventy-two percent of the paralytic patients were under 5 years of age, and there was approximately the same proportion in that age group in both races.

TABLE 1.—*Poliomyelitis in Charleston County, S. C., October 1938 to December 1939, by age and race for paralytic and nonparalytic cases*

Age group, in years	Paralytic			Nonparalytic		
	White	Colored	Total	White	Colored	Total
0–1	5	15	20	1	3	4
1–2	14	23	37	0	4	4
2–3	6	18	24	1	0	1
3–4	10	7	17	4	0	4
4–5	5	11	16	3	1	4
Under 5	40	74	114	9	8	17
5–9	17	17	34	10	3	13
10–14	2	4	6	5	0	5
15–19	3	0	3	0	0	0
20 and over	1	1	2	2	0	2
All ages	63	96	159	26	11	37

Because of the concerted effort of the local health authorities, there is good reason to believe that eventually very few paralytic cases were not reported. Even with the intensive effort to locate and report every illness caused by the disease, however, many paralytic cases were not discovered until some months after onset and two not until a year afterward. Table 2 shows the number of cases reported according to the interval from time of onset of systemic symptoms until the report was received at the county department of health. It is noted that two-thirds of the paralytic cases were reported within

the first week of illness and that reporting was more prompt in the city of Charleston than in the rural districts.

TABLE 2.—*Interval between onset and report of cases*

Interval in weeks	Paralytic				Nonparalytic			
	City		County		City		County	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Less than 1	57	67.0	45	66.1	19	82.6	10	83.4
1-2	19	22.3	12	17.6	4	17.4	1	8.3
2-3	5	5.9	0	0	0	0	1	8.3
3-4	1	1.2	0	0	0	0	0	0
More than 4	3	3.6	[1] 11	16.3	0	0	0	0
Total	85	100.0	68	100.0	23	100.0	12	100.0
Unknown	1		5		1		1	

[1] 2 cases reported 1 year or longer after onset.

While it is believed that nearly all paralytic cases were found, there is no means of determining or estimating the number of nonparalytic cases. It seems certain, however, that the number reported forms only a small part of those which actually occurred. This impression is substantiated by the fact that there was a higher proportion of nonparalytic cases (35 percent) in the group of patients classified by the investigators as of good economic status than among those considered as of fair or poor economic condition (13.4 percent). Undoubtedly, this is a reflection of the greater acuity of diagnosis in the group better situated economically rather than any difference in type of case. If the same ratio of nonparalytic to paralytic cases obtained in the poorer economic group as existed in the better group, the expected number of nonparalytic cases would be three to four times as many as were actually reported. In general, the physicians concerned with the care of patients did not diagnose nonparalytic poliomyelitis unless both the spinal fluid findings and symptoms were characteristic of the disease or unless the suspected illness occurred in a family where a paralytic case had been discovered previously. It is highly probable that many illnesses existed that were, in fact, caused by the virus of poliomyelitis, but which were not brought to the attention of a physician, or, if they were, in which the evidence was not considered sufficient to diagnose the case accurately as poliomyelitis.

Hospital facilities for the patients were adequate and the hospitalized cases were treated in the contagious wards of Roper Hospital. These wards were expanded and additional beds for indigent patients were made available with funds from outside sources, largely from the Children's Bureau of the United States Department of Labor and the National Foundation for Infantile Paralysis; these funds were supervised by the Division of Crippled Children of the State Board of

Health. Of the 185 patients for whom information concerning hospitalization is available, 160, or 86.5 percent, received hospital care during the acute stage of the illness.

CLINICAL DESCRIPTION OF THE CASES

Most of the clinical data concerning the acute phase of the disease were obtained by two of us (D. J. D. and F. J. W.) through personal interview with the patients or their parents. In the majority of instances this information was obtained shortly after the onset of illness and rarely longer than 2 months after onset. Records of spinal fluid examination and further progress of the illness were obtained from Roper Hospital records for both in-patients and out-patients.

It was not possible to secure for all cases complete and accurate clinical information dealing with the acute stage of illness. At the time of interview each investigator recorded his impression of the reliability of the data given by the informant. For this study only those cases have been selected for which it is believed that the data secured are reliable, though not necessarily complete for all items. The group selected comprises 57 paralytic patients, of whom 44 were white and 13 colored, and 18 nonparalytic, all white except one. Thirty-three of the paralytic patients and 9 of the nonparalytic ones were under 5 years of age.

Table 3 shows the percentage of patients who at any time during their acute illness experienced the various symptoms listed. The percentage calculations are based on data indicating either the presence or absence of a symptom, and in an instance where this was uncertain or unknown the case was excluded from the calculation for that specific item. Biphasic type refers to an initial onset with febrile symptoms lasting about 48 hours, followed by a day or so of apparently normal temperature, then a recrudescence of fever and acute symptoms.

Symptoms referable to the nervous system were numerous and the commonest were headache, stiff neck, restlessness, and drowsiness. Gastro-intestinal disturbance occurred very frequently, and vomiting, anorexia, nausea, and constipation were most common. There was little difference between the paralytic and nonparalytic cases except that tremors and muscle twitching were absent in the nonparalytic group.

An analysis of the data was made in an attempt to determine whether or not there was a difference in frequency of symptoms between patients under 5 years of age and those older. The symptoms of headache, dizziness, anesthesia, paresthesia, disturbance of the sensorium, tremor, and muscle twitching were recorded more frequently in the older group, while coryza, cough, and diarrhea were noted more frequently in the younger group.

TABLE 3.—*Occurrence of symptoms and signs in 75 selected cases of poliomyelitis*

Symptom or sign	Paralytic cases			Nonparalytic cases		
	Number of cases	Number having symptoms	Percent	Number of cases	Number having symptoms	Percent
Fever:						
Biphasic type	57	16	28.0	18	4	22.2
Temperature 101° F. or over for 5 days or more	56	14	25.0	18	3	16.7
Respiratory system:						
Sore throat	52	14	27.0	15	5	33.3
Coryza	57	11	19.2	18	1	5.5
Cough	57	9	15.8	18	1	5.5
Gastro-intestinal system:						
Vomiting	57	36	63.0	18	9	50.0
Anorexia	56	33	59.0	18	10	55.5
Nausea	57	31	54.5	18	11	61.0
Constipation	56	25	44.5	17	5	29.5
Abdominal pain	[1](57)	7	[1](12.2)	[1](18)	0	[1](0.0)
Diarrhea	57	5	8.8	18	1	5.5
Nervous system:						
Headache	49	35	71.4	18	12	66.7
Stiff neck	54	38	70.0	18	14	78.0
Restlessness	56	39	70.0	17	7	41.1
Drowsiness	57	40	70.0	18	8	44.5
Irritability	55	35	63.5	18	6	33.3
Stiff back	51	26	51.0	18	9	50.0
Tenderness at site of paralysis	53	29	54.7			
Tenderness at other sites	51	2	3.9	18	2	11.1
Pain at site of paralysis	53	26	49.0			
Pain at other sites	54	7	13.0	18	9	50.0
Muscle twitching	53	10	18.8	18	0	0.0
Dizziness	51	7	13.7	17	1	5.9
Tremors	55	7	12.7	16	0	0.0
Sensorium disturbances	45	5	11.1	15	0	0.0
Paresthesia	44	3	6.8	15	1	6.7
Anesthesia	46	2	4.3	17	0	0.0
Diplopia	54	1	1.8	17	0	0.0
Photophobia	[1](57)	1	[1](1.7)	[1](18)	2	[1](11.1)
Other symptoms:						
Sweating	55	19	34.5	18	3	16.7
Anuria	56	9	16.0	18	1	5.5
Chills	57	8	14.0	18	1	5.5

[1] Numbers in parentheses indicate that negative data were not recorded on original records; for the other items the negative information as well as positive was recorded in response to a definite question.

In patients having a biphasic temperature curve, muscle paralysis first appeared from the fourth to the fourteenth day of illness, and the median elapsed time between onset and evidence of paralysis was 7 days. In patients not exhibiting the biphasic temperature curve, characteristic paralysis occurred from the second to the twelfth day, and the median onset of paralysis was 4 days after the initial symptoms.

In addition to the signs and symptoms listed in the table for the 75 selected cases, other symptoms were occasionally noted during the acute stage of the illness in some of the 196 reported cases. There is a record of epistaxis in 3 cases; convulsions in 2 nonparalytic cases; and inability to see for several days, marked salivation, and slight ataxia in 1 case each. Two patients showed definite spasticity of both lower extremities, and in one of them the condition lasted for 2 weeks.

One case was of considerable interest because of the infrequent occurrence of this type. A 1-year-old colored male had a typical

attack with definite paralysis of one arm and one leg. The spinal fluid, examined on the day after paralysis developed, showed only 4 cells per cubic millimeter. Recovery from this attack was as complete as it is possible to determine in a child of this age, and he was discharged 3 weeks after onset. Fifty-eight days later there was a recurrence of systemic symptoms, followed by severe paralysis of all extremities. In October 1940, this paralysis was classified as severe in all extremities.

Another case in many respects resembled the adult cases described as occurring in the Los Angeles County Hospital epidemic in 1934 (*1*). The patient, the daughter of a physician, was 21 years old. The onset of her illness was very gradual and insidious, beginning with a severe headache lasting for a week and followed by nausea and vomiting and severe abdominal pain and tenderness. Elevation of temperature was present for only a few hours on the fourteenth day of illness. Muscular weakness started on the eleventh day, at which time it was general rather than localized, and then became gradually more severe until the twenty-second day when both legs and one arm were involved in localized paralysis. Muscle tenderness and pain were unusually severe and lasted for 5 weeks. Recovery was slow and residual paralysis is still present.

Data concerning the results of spinal fluid examinations made in the hospital were available for 123 paralytic and for 34 nonparalytic cases. The spinal fluid was considered abnormal if the cell count was increased above 10 cells per cubic millimeter, or if globulin was present. In most instances both conditions were present. Of the paralytic cases, 115 (93.5 percent) were abnormal at the time of examination. In the nonparalytic group, 29, or 85 percent, were abnormal. Examination of the spinal fluids showing normal findings were all made within 10 days of onset of illness, and 6 of the 13 were withdrawn and examined twice. This experience is similar to that of others who have found cases of poliomyelitis with a normal spinal fluid (*2*).

Of the 196 persons in Charleston County who were known to have had the disease during the period of this epidemic, 37, or 18.8 percent of the cases were nonparalytic, and 16 patients died during the year following onset. Since the proportion of nonparalytic cases varies from epidemic to epidemic, depending certainly on the criteria of diagnosis and possibly on other factors, it is useful to consider the case fatality rate only on the basis of paralytic cases. In this series, omitting 2 deaths which were due to causes other than poliomyelitis, there were 14 deaths among 159 paralytic cases, or a fatality rate of 8.8 percent.[3]

[3] Material from 2 of the typical fatal cases, inoculated into monkeys by Dr. Charles Armstrong of the National Institute of Health, produced clinical symptoms and pathological lesions typical of experimental poliomyelitis.

Table 4 shows the distribution of the cases by sex and race and fatality rates by location of paralysis. Included in the classification as spinal paralysis are patients who had muscle weakness indicating that only the spinal nerves were affected. The craniospinal group had both cranial and spinal nerves involved, and the cranial group had only cranial nerves affected. The table is constructed to show the significant difference[4] in the distribution of the types of paralysis between the sexes. In this experience males were evidently more than twice as prone to have involvement of cranial nerves as were females. This difference also occurs in the fatality rate, the rate of death for males being nearly three times as great as for females. The craniospinal group, which included the cases of respiratory paralysis, had the highest fatality rate, 53 percent and 50 percent for males and females, respectively. Twelve of the 14 deaths occurred between the fourth and nineteenth days of illness, the other 2 occurred 3 and 7 months after onset, respectively. White females had the fewest cases of cranial paralysis, with only 2 of 28 cases being so affected.

TABLE 4.—*Distribution of reported cases by sex, race, and location of paralysis*

	Male								Female							
	White		Colored		Total				White		Colored		Total			
	Cases	Deaths	Cases	Deaths	Cases	Percent of cases	Deaths	Fatality rate	Cases	Deaths	Cases	Deaths	Cases	Percent of cases	Deaths	Fatality rate
Paralytic:																
Spinal	24	0	35	0	59	72.0	0	0.0	26	0	42	0	68	88.3	0	0.0
Craniospinal	9	5	8	4	17	20.7	9	53.0	1	0	5	3	6	7.8	3	50.0
Cranial	2	0	4	1	6	7.3	1	16.6	1	0	2	1	3	3.9	1	33.3
Total	35	5	47	5	82	100.0	10	12.2	28	0	49	4	77	100.0	4	5.2
Nonparalytic	15	0	8	0	23	[1] 0.28:1	0	0.0	11	0	3	0	14	[1] 0.18:1	0	0.0

[1] Ratio of nonparalytic to paralytic cases.

Although the data for the two races are not summarized, examination of the table will show that there is no difference in the distribution of types of paralysis between the white and colored patients, and consequently no significant differences in the case fatality rates. A much higher proportion of nonparalytic cases was found among white patients than among colored, probably owing to the fact that Negroes are more reluctant to seek medical aid except for severe illnesses. Using the provisional 1940 Census figures for the total population, and the distribution of the population between white and colored of the 1930 Census, which is believed to be not far different from that in 1940, the incidence of paralytic cases was 114 per 100,000 for the white, and 147

[4] Difference in percentage of spinal type is 2.5 times the standard deviation of the difference.

for the colored. This indicates that the colored race is probably at least as susceptible as the white.

CONVALESCENT PROGRESS

It was believed valuable to attempt a summary of the physical condition of all patients at least 1 year after onset of the disease in an effort to get a general view of the more permanent effects of an epidemic of poliomyelitis of this intensity upon a community. Most follow-up studies deal only with special classes of patients, but this experience afforded an opportunity to follow all cases known to have occurred in a population unit of over 100,000 persons during a severe epidemic.

Records were available for every case occurring in Charleston County from October 1938 to December 1939, and in October of 1940 they were reviewed in order to ascertain the orthopedic condition of each patient. With only two exceptions, all cases were of at least 1 year's duration, and since the epidemic occurred in the late spring and early summer of 1939, the vast majority of cases had had their onset 12 to 18 months before this review.

Forty-four cases were or had been under the care of a private physician and 152 were clinic patients. One of us (M. S. A.) regularly visited all the clinic patients in their homes and arranged to have them examined at intervals at the orthopedic out-patient clinic of Roper Hospital by Dr. F. A. Hoshall, the State orthopedic consultant. The Division of Crippled Children of the State Board of Health had supplied necessary apparatus with the aid of funds from the National Foundation for Infantile Paralysis and from the Children's Bureau of the United States Department of Labor. A description of the provisions for nursing and orthopedic care both during and after the epidemic may be found in previous publications (*3*, *4*).

In table 5 the paralytic cases have been classified in six different groups according to degree of involvement as of October 1940. The first group includes patients who had had definite localized muscular weakness or paralysis at some time during their illness, but who had recovered by October 1940. Group II comprises patients who still exhibited slight muscle weakness, but whose disability did not limit their activity to any extent. The third group includes those who had a definite residual paralysis at the time of review, but whose prognosis was considered to be good if proper orthopedic care was continued. These were cases either still showing rapid improvement or whose disability could be corrected by surgical means, that is, tendon transplants or bone blocks. It was believed that with continued proper treatment they would have nearly unlimited activity. Group IV includes cases having a definite residual paralysis which

does not lend itself to correction, and while not incapacitating the patient entirely, does limit him markedly in his activity. Nearly all of this group require apparatus or support of some variety. Group V comprises those patients who are completely incapacitated, usually with all extremities involved. All patients who died are included in group VI. Two of these died during the year of causes other than poliomyelitis, and the state of residual paralysis was unknown at time of death.

Table 5 shows the percentage of the total of 159 paralytic cases in each of these defined groups for all ages and for the age periods under 5 years, 5 to 9 years, and 10 years and over. The cumulative percentages for each group and the groups less severely affected are calculated similarly. It is evident that 57.3 percent of the total paralytic cases fall into group III or one of the less severely affected groups. This proportion of cases thus has, or is expected to have, nearly unlimited physical activity. A further group, comprising 27 percent of the total, has limited activity but is not incapacitated. This leaves 25 cases, or 15.7 percent of the total, who were either incapacitated by the disease or are dead.

TABLE 5.—*Classification of all cases by degree of paralysis in October 1940*

	Under 5 years			5-9 years			10 years or over			Total		
	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent	Number	Percent	Cumulative percent
Group I: No residual paralysis	37	32.4	32.4	14	41.2	41.2	2	18.2	18.2	53	33.3	33.3
Group II: Slight residual paralysis	9	7.9	40.3	5	14.7	55.9	1	9.1	27.3	15	9.5	42.8
Group III: Eventually slight residual paralysis by operation or continued treatment	17	14.9	55.2	4	11.8	67.7	2	18.2	45.5	23	14.5	57.3
Group IV: Definite residual paralysis	33	29.0	84.2	8	23.5	91.2	2	18.2	63.7	43	27.0	84.3
Group V: Incapacitated	8	7.0	91.2	0	0	91.2	1	9.1	72.8	9	5.7	90.0
Group VI: Died	[1] 10	8.8	100.0	3	8.8	100.0	3	27.2	100.0	[1] 16	10.0	100.0
Total	114	100.0	-----	34	100.0	-----	11	100.0	-----	159	100.0	-----

[1] 2 deaths, 4 months and 9 months, after onset of poliomyelitis due to syphilis and "meningitis," respectively. Residual paralysis unknown at time of death.

The evidence at hand does not indicate that there is any difference in the outcome among the various age groups. This includes a consideration of patients under 2 years of age, as well as the groups shown in the table.

Table 5 shows the outcome of the paralytic cases only. If the 37 nonparalytic cases are included in the summary, then 128, or 65.2

percent, of the 196 known cases have, or are expected to have, unlimited activity and will not be handicapped by the disease.

These data are of economic and sociological importance. In this experience, 57.3 percent of all paralytic cases will probably not be seriously handicapped in their ability to earn a living, while those with a permanent residual paralysis (27 percent) will probably be able to earn their living in only a restricted number of ways. Those totally incapacitated, a relatively small group comprising 5.7 percent of all paralytic cases, will always be dependent, and 10 percent of the total have died.

In an effort to ascertain whether there was any change in the severity of the disease, as measured by the residual paralysis, with the seasonal progress of the epidemic, the first third of the cases to occur were compared with the second and last third of the total number of cases. There was no difference either in the distribution of severity of residual paralysis or in the case fatality rate between the cases having their onsets at different periods of the epidemic. This is similar to the findings of Henningsen and Rasch (5).

SUMMARY

Cases of poliomyelitis occurring in the Charleston County, South Carolina, epidemic during the late spring and early summer of 1939 were found to be similar in clinical characteristics to cases of the disease in other parts of the country. In this experience males were apparently more prone to have cranial nerve involvement than were females, and had a higher fatality rate. The colored race appeared to be at least as susceptible as the white to the disease itself, and a similar percentage of fatalities occurred. A review of the convalescent progress of all known cases in Charleston County a year or more after onset of the illness indicates that 57.3 percent of the paralytic cases, or 65.2 percent of all reported cases including nonparalytic ones, have or probably will have nearly unlimited activity and will not be seriously handicapped in their ability to earn a living. Twenty-seven percent of the paralytic cases have limited activity; 5.7 percent are incapacitated; and 10 percent have died. The evidence does not indicate any difference in the degree of residual paralysis among the various age groups, or among persons attacked at different times during the epidemic.

ACKNOWLEDGMENTS

The authors are indebted to Dr. F. A. Hoshall, State orthopedic consultant, and Mr. F. O. Bates, superintendent of Roper Hospital, for permission to examine the records of patients; to Dr. G. E. McDaniel, epidemiologist of the South Carolina State Board of Health,

and Dr. Leon Banov, health officer of Charleston, S. C., for assistance in the study; and to Passed Assistant Surgeon A. G. Gilliam, United States Public Health Service, under whose direction the study was initiated.

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CAUSES OF PHYSICAL DISQUALIFICATION UNDER THE SELECTIVE SERVICE LAW. EARLY INDICATIONS

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A serious state of ill-health of American youth is revealed by the figures available as to the results of medical examinations made so far under the Selective Service Law of 1940. Early indications are that more than 40 percent of examined men are being classified as unfit for general military service. This estimate includes (*a*) rejection by Selective Service local boards as unfit for any military service (Class IV–F, about 20 percent of examined men), (*b*) classification by local boards as fit for limited military service only (Class I–B, about 12 percent), and (*c*) rejection at Army induction centers (Classes I–B and IV–F, 11 percent, based on the population examined by local boards), yielding a total of 43 percent. The combined rate for rejection from any military service (Class IV–F) by local boards and induction centers is about 28 percent.

The local board figures represent an estimate based on review of a large proportion of the examination records received by the National Headquarters of the Selective Service System, and cover the period from the beginning of examinations under the Act to about the end of March.[1] The induction center data are based on complete figures for the period up to February 1 (18,971 men returned to local boards

[1] Based on release from Selective Service System, dated April 24, 1941. Acknowledgment is made to Lt. Oliver H. Folk, Medical Division, National Headquarters, Selective Service System, for making data available at the earliest possible moment and for assistance in interpretation.

out of 120,689 men examined at induction centers).[2] It will be observed that the induction center figures just quoted yield a percentage of 15.7, rather than the 11 percent given in the first paragraph. Since the induction center examinations constitute a second screening of the men who appear before the local boards, it is most reasonable to regard the population base for induction center examinations as the number appearing before local boards. The correction is obtained by multiplying the 15.7 by 0.68 (the proportion of men examined at local boards who were sent to induction centers).[3] It should be pointed out that the men returned by induction centers to local boards were classified as either rejected for any military service (Class IV–F) or as qualified for limited military service only (Class I–B). The percentages of examined men (based on the total appearing before local boards) classified in these two groups by the induction centers were, respectively, 7.9 (Class IV–F) and 2.8 (Class I–B).

In interpreting these findings, the question of age is of importance. The draft ages are 21 to 35. However, the effect of deferments for reasons other than physical status tends to concentrate the group examined in the ages 21 to 25, the period when physical health should be at its best.

The rates of disqualification thus far under the Selective Service Act of 1940 are higher than those observed during most of the period of the World War, when less than a third were classified as unfit for general military service.[4] However, this fact does not justify the conclusion that the health of American youth is inferior today to what it was 20 years ago. Improved diagnostic techniques, changes in physical standards, a different situation with respect to the immediate urgency for manpower, and many other factors enter in to invalidate comparisons. The important point is that a large proportion of men in the most healthy ages are deficient in health to the extent that they are being classified as unfit for general military service and that many of the conditions from which they suffer are of a remediable, often of a preventable, nature.

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[2] Release by the Office of the Surgeon General of the Army, dated April 12, 1941. Acknowledgment is made to Col. John W. Meehan, Office of the Surgeon General, U. S. Army, for making data available at the earliest possible moment and for assistance in interpretation.

[3] That is, 1 minus the sum of 0.20 and 0.12. It is to be noted that the correction is equivalent to that which would be obtained by multiplying the number of men examined at induction centers by the ratio of 1 to 0.68.

[4] See the following:

Reports of the Provost Marshal General to the Secretary of War on the Operations of the Selective Service System. Government Printing Office, Washington. First Report 1917; Second Report 1919.

Love, Albert G., and Davenport, Charles B.: Defects found in drafted men. Statistical information compiled from the draft records, showing the physical conditions of the men registered and examined in pursuance of the requirements of the Selective Service Act. Government Printing Office, Washington, 1920.

Britten, Rollo H., and Perrott, George St. J.: Summary of physical findings on men drafted in the World War. Pub. Health Rep., 56: 41 (1941). Reprint No. 2223.

Deep interest attaches to the relative importance of the various causes of disqualification. Tabulations have been made by both the National Headquarters of the Selective Service System and by the Office of the Surgeon General of the Army according to the primary cause for disqualification. In table 1 these data have been combined to show the percentage of examined men who were classified as not qualified for general military service, according to certain specific impairments or groups of impairments, the detail being such as is permitted from the present preliminary tabulations. The table also gives the rates separately for rejection (Class IV–F) and for classification as qualified for limited military service only (Class I–B). Table 2 gives corresponding data as a percentage distribution in which all causes is equal to 100. The local board data [5] by cause are based on a sample of examination reports for men classified as not available for general military service (14,593 men unfit for any military service and 6,432 men fit for limited service only). The induction center data [6] are complete for all examinations made up to February 1.[7]

[5] Based on release from Selective Service System referred to above. The data given in the release are in the form of a percentage distribution of rejected (or limited service) men according to cause. The two series were multiplied, respectively, by 0.20 and 0.12 to give the rates per 100 examined men.

[6] Based on release from the Office of the Surgeon General of the Army referred to above, supplemented by certain information made available directly through the kindness of Col. John W. Meehan of that office. For the purpose of these preliminary figures, it has been necessary to apply the percentages for Class IV–F and Class I–B (7.9 and 2.8, respectively) to each cause.

[7] The percentages of examined men (see second paragraph of this article) classified as not qualified for general military service (Class IV–F and Class I–B) by local boards and by induction centers separately are as follows:

	Local boards	Army induction centers
All	32.00	10.68
Defective or deficient teeth	6.26	2.06
Eye diseases	3.62	1.41
Diseases of the cardiovascular system	3.03	.66
Musculo-skeletal diseases	2.65	.52
Nervous and mental diseases	1.83	1.12
Ear, nose, throat diseases	1.37	1.02
Hernia	1.46	.56
Diseases of the respiratory system	1.18	.53
Venereal diseases	1.13	.49
Foot diseases	1.03	.39
Overweight and underweight	1.05	.32
Diseases of the genito-urinary system	.62	.46
Endocrine disturbances	.49	.090
Varicose veins	.35	.13
Mouth and gum diseases	.22	.17
Skin diseases	.16	.15
Diseases of abdominal viscera	.31	----
Hemorrhoids	.15	.073
Underheight	.10	----
Other specified diseases	.075	.51
Generally unfit	2.83	----
Obviously defective	2.06	----

TABLE 1.—*Percentage of examined men classified as not qualified for any military service or as qualified for limited service only under the Selective Service Act of 1940,[1] according to cause*

Diseases [2]	Percentage of examined men classified as—		
	Not qualified for general military service [3] (Classes IV-F and I-B)	Not qualified for any military service (Class IV-F)	Qualified for limited service only (Class I-B)
All	42.68	27.92	14.76
Defective or deficient teeth	8.32	4.33	3.99
Eye diseases	5.03	2.51	2.53
Diseases of the cardiovascular system	3.69	3.02	.67
Musculo-skeletal diseases	3.17	2.11	1.07
Nervous and mental diseases	2.95	2.54	.41
Ear, nose, throat diseases	2.39	1.77	.61
Hernia	2.02	.93	1.10
Diseases of the respiratory system	1.71	1.33	.39
Venereal diseases	1.62	1.02	.60
Foot diseases	1.42	.77	.65
Overweight and underweight	1.37	.75	.62
Diseases of the genito-urinary system	1.08	.72	.36
Endocrine disturbances	.58	.49	.10
Varicose veins	.48	.34	.14
Mouth and gum diseases	.39	.30	.094
Skin diseases	.31	.23	.079
Diseases of abdominal viscera	.31	.23	.082
Hemorrhoids	.22	.12	.10
Underheight	.10	.10	.004
Other specified diseases	.58	.44	.14
Generally unfit	2.83	1.80	1.03
Obviously defective [4]	2.06	2.06	----

[1] These data are a combination of local board and induction center examinations. See text for description of how the rates were obtained.
[2] The term "disease" is used to mean disease, defects, or impairments. Data are classified by primary cause.
[3] Sum of second and third columns.
[4] Classified by local boards as obviously defective without medical examination.

TABLE 2.—*Percentage distribution of (a) men not qualified for any military service according to cause and (b) men qualified for limited military service only, according to cause* [1]

Diseases [2]	Percentage distribution		Diseases [2]	Percentage distribution	
	Not qualified for any military service (Class IV-F)	Qualified for limited service only (Class I-B)		Not qualified for any military service (Class IV-F)	Qualified for limited service only (Class I-B)
All	100.00	100.00	Overweight and underweight	2.69	4.20
Defective or deficient teeth	15.51	27.03	Diseases of the genito-urinary system	2.58	2.44
Eye diseases	8.99	17.14	Endocrine disturbances	1.76	.68
Diseases of the cardiovascular system	10.82	4.54	Varicose veins	1.22	.95
Musculo-skeletal diseases	7.56	7.25	Mouth and gum diseases	1.07	.64
Nervous and mental diseases	9.10	2.78	Skin diseases	.82	.54
Ear, nose, throat diseases	6.34	4.13	Diseases of abdominal viscera	.82	.56
Hernia	3.33	7.45	Hemorrhoids	.43	.68
Diseases of the respiratory system	4.76	2.64	Underheight	.36	.027
Venereal diseases	3.65	4.07	Other specified diseases	1.58	.95
Foot diseases	2.76	4.40	Generally unfit	6.45	6.98
			Obviously defective [3]	7.38	----

[1] These data are a combination of local board and induction center examinations. See text for description of how the rates were obtained.
[2] The term "disease" is used to mean disease, defects, or impairments. Data are classified by primary cause.
[3] Classified by local boards as obviously defective without medical examination.

The fact that 8 percent of all examined men, largely in the ages from 21 to 25, are being classified as not available for general military service by reason of tooth defects is a cause for serious concern and points to the need for more extended dental care. Next in order of frequency are eye defects and diseases (mostly defective vision). Consideration of the other groups will reveal many which are made up largely of remediable conditions. The correction of defects among youth must be regarded as of importance not only from the point of view of military man power, but also from that of industrial man power and public health generally. Furthermore, over and above the need for remedial care which these figures show is the realization that many of the impairments could have been prevented by more extended public health programs during the period of growth of these individuals. This fact emphasizes the need for further development of such programs in the future.

A PORTABLE UNIT FOR THE DETERMINATION OF HALOGENATED HYDROCARBONS [1]

By H. C. DUDLEY, *Associate Chemist, United States Public Health Service*

The wide use of solvents as cleaners, vehicles, and degreasers has occasioned the introduction of compounds or mixtures having little or no fire hazard. The chlorinated hydrocarbons thus enter into many manufacturing processes requiring solvents which resist ignition. In the study of workroom atmosphere contaminated by various halogenated hydrocarbons, there arose a need for an easily portable rugged sampling apparatus. The apparatus here described was built in this laboratory. It is designed to be easily carried by one person, while sufficiently rugged to withstand shipment.

The apparatus has been extensively used during the past 3 years, being applied to the sampling of workroom atmospheres for carbon tetrachloride, trichlorethylene, methyl bromide, and the like. Although not primarily designed for the purpose, units have been used successfully in studying high concentrations of methyl bromide in fumigation chambers and greenhouses.

The principle of this sampling device is similar to that employed by others, the air stream being passed through some type of heated tube, which serves to decompose the organic halides. Methods of absorption of the halides vary but all are based on some simple gas-scrubbing device. Sampling devices based on these principles but differing somewhat in design, portability, and ruggedness have been described by Olsen et al. (*1*) and Tebbens (*2*).

[1] From the Division of Industrial Hygiene, National Institute of Health.

APPARATUS AND METHODS

The sampling apparatus consists of a calibrated flowmeter, with a thin disc orifice, a one-piece quartz tube containing platinum gauze or coils (the whole tube heated by an external electrical resistance), and two bubblers connected in series. Figures 1 and 2 show details of the apparatus.

The air stream is drawn through the unit by means of a vacuum pump of convenient design. In usual practice where house vacuum lines are not available a rotary type, motor-driven pump has been

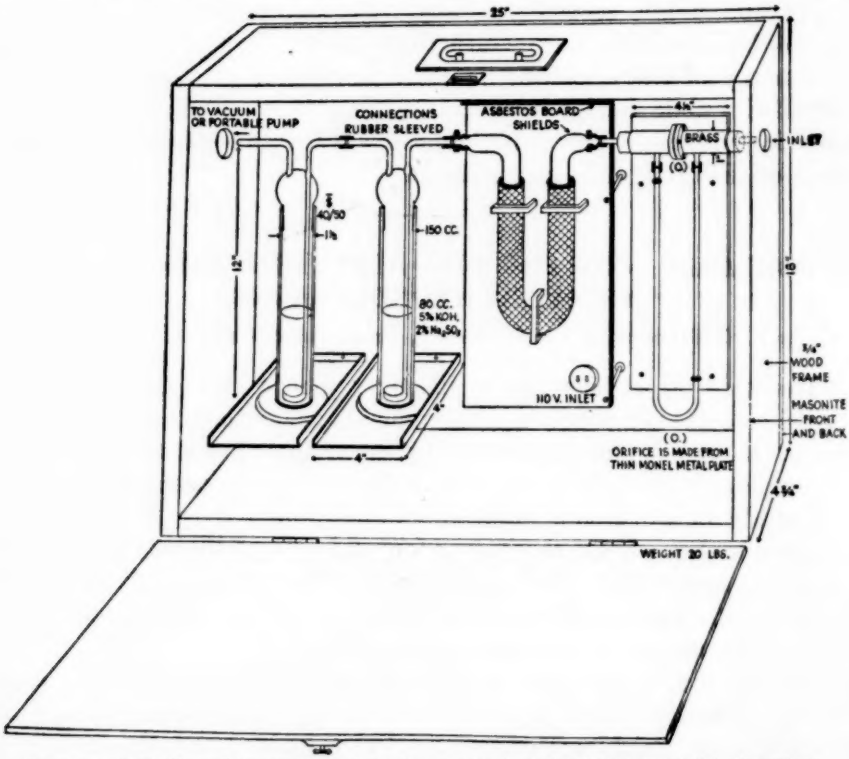

FIGURE 1.—Portable unit for sampling atmosphere contaminated with halogenated hydrocarbons.

used. Commercial pump units suitable for 110–220 alternating current or direct current in a separate carrying case are convenient. Those used for impinger dust sampling will operate two of these units simultaneously, with individual control by means of by-pass needle valves.

The air flow of two separate units used in various studies was 2.45 liters per minute and 2.40 liters per minute. The flow was calibrated against standard dry meters, under actual operating conditions. A flow of approximately 2.5 liters per minute has been found to be the most convenient from the standpoint of time in sampling low concentrations of organic halides in air, and is near the maximum flow

which bubblers of this size and type will handle efficiently. In sampling workrooms of the usual type a run of 30 minutes or longer is required to obtain sufficient halogen for determination by most chemical methods. In the case of high concentrations of methyl bromide in fumigation chambers and greenhouses a sampling time of 5 to 10 minutes was ample.

The heating element surrounding the quartz tube (see fig. 2) was made from Nichrome wire, the length and size of wire adjusted so

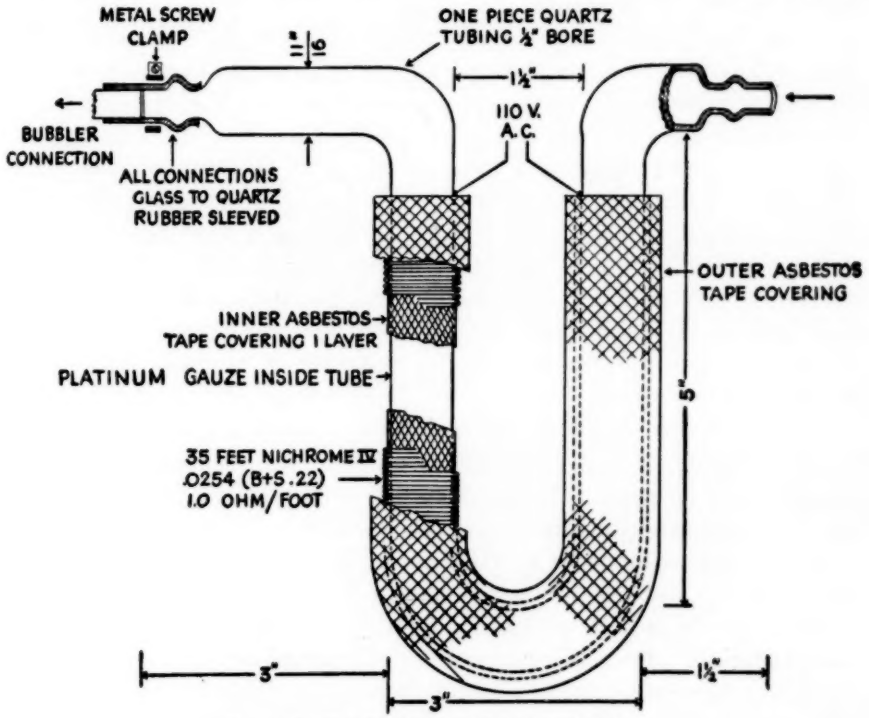

FIGURE 2.—Details of combustion tube assembly.

that a temperature of about 800° C. was obtained at 110 volts alternating current. In general the quartz tube containing platinum gauze or spiral effectively decomposes the organic halogen compounds if a bright red or red-orange color is noted under the entire length of the asbestos tape wrapping. At 110 volts alternating current the heating elements draw approximately 4 amperes when 35 feet of Nichrome IV, 0.0254 (B. & S. 0.22), are used in the winding. In two cases the heater elements have been in use for more than a year without replacement.

CHEMICAL PROCEDURE

Into each bubbler there was placed 80 cc. of a solution of 5 percent potassium hydroxide and 2 percent sodium sulfite. The ground glass stoppers of the bubblers were lightly greased, and the sampling was

begun. When the sampling was complete, the bubblers were removed from the case, the contents poured into separate flasks, and the bubblers rinsed with distilled water. The bubbler fluids from the two bubblers were analyzed separately.

The basic sulfite solutions, containing an excess of both potassium hydroxide and sodium sulfite, were made acid with 12 normal sulfuric acid, and potassium permanganate solution was added dropwise until the solution was cleared of excess sulfur dioxide. An excess of permanganate is to be avoided.

From this point a number of chemical methods for the determination of halogens suggest themselves. The usual Volhardt procedure, in which an excess of silver nitrate is added and the excess back titrated with thiocyanate, has been used. The difficulties found here have been due largely to a decomposition of the thiocyanate to the cyanide. When larger quantities of halogens are present the errors are negligible. However, the more laborious procedure of a gravimetric determination of the silver halides has been found to be more advantageous with smaller amounts of halogens. Filtered bubbler solutions and reagents must be used in this last procedure, and reagent blanks are required because of the quantity of reagents and volume of the final solutions.

It must be stressed that there should be an excess of sodium sulfite in the bubblers in order to convert all the halogen compounds to the simple halogen acids after acidification with sulfuric acid. In moist air the combustion in the quartz tube is largely carried to completion, with the formation of HCl, HBr, etc. However, when dry air is being sampled there is evidence which shows that other more complex compounds are formed, i. e., $COCl_2$, $COBr_2$, etc., as well as free chlorine and bromine. It is the purpose of the sulfite to convert these materials to the corresponding simple halogen acids. It has been found that an insufficient amount of sulfite caused a loss of chlorides when standard samples of carbon tetrachloride or trichlorethylene were being analyzed.

Concentrations lower than 1 mg. of organic halogen per liter of air gave negative findings in the second bubbler at air flows of less than 2.5 liters per minute, that is if the units were in perfect working order. If much halogen is noted in the second bubbler when moderate concentrations of halogenated hydrocarbons are being sampled it is evidence that some part of the apparatus is functioning incorrectly.

In order to determine the absolute efficiency of this apparatus a series of determinations were made using purified carbon tetrachloride and trichlorethylene. The units were placed in operation at the calibrated flow, and air from the room was drawn through them, as

in regular field procedures. A small weighed bubbler containing the solvent was arranged so that air forced through the small bubbler entered the intake of the unit. The solvent vapors then mixed with the air stream and the resultant chlorides were determined by a gravimetric procedure as AgCl. The small bubbler was accurately weighed before and after the test run, the difference in weight giving the quantity of solvent entering the units. Table 1 gives the details of the findings of these test runs. The results indicate that recovery is quantitative. These solvents were used in the check tests since it is believed that they are representative of the usual chlorinated hydrocarbons employed industrially and that they are also more resistant to thermal decomposition.

TABLE 1.—*Efficiency of units as shown by analysis of weighed amounts of carbon tetrachloride and trichlorethylene*

Run	Bubbler	AgCl weighed, gm.[1]	Total solvent calculated, gm.[2]	Total solvent taken, gm.	Run	Bubbler	AgCl weighed, gm.[1]	Total solvent calculated, gm.[2]	Total solvent taken, gm.
Carbon tetrachloride (CCl_4) [3]					Trichlorethylene ($ClCH{:}CCl_2$) [4]				
A	1	0.6293	0.1712	0.1715	E	1	0.3207	0.0997	0.0997
	2	0.0088				2	0.0056		
B	1	0.2048	0.0554	0.0552	F	1	0.4965	0.1527	0.1545
	2	0.0019				2	0.0032		
C	1	0.6435	0.1749	0.1728	G	1	0.7592	0.2358	0.2387
	2	0.0081				2	0.0125		
D	1	0.9194	0.2476	0.2468	H	1	0.2526	0.0772	0.0787
	2	0.0043				2	0.0000		

[1] Weight of AgCl given here corrected for total reagent blank equal to 0.0032 gm. AgCl.
[2] Factors AgCl to CCl_4: 0.2683.
AgCl to C_2HCl_3: 0.3056.
[3] Average recovery 100.4 percent.
[4] Average recovery 98.9 percent.

Tables 2 and 3 show some results obtained in actual field determinations using this apparatus.

TABLE 2.—*Results of sampling various workrooms for halogenated hydrocarbons*

Compound known to be present	Sampling time, min.	Volume of sample, liters	Total hydrocarbon determined, mg.	Calculated concentration, mg./liter	Remarks
Carbon tetrachloride	17	41	12.60	0.31	
Do	13	32	4.98	.15	
Do	27	65	36.47	.56	
Trichlorethylene	30	73.5	Trace		
Methyl bromide	30	72	0.97	.013	
Do	5	12	28.70	2.4	Duplicate runs at same time.
Do	5	12.3	35.56	2.9	
Do	5	12	33.02	2.8	Do.
Do	5	12.3	38.78	3.1	

TABLE 3.—*Results of tests of concentrations of CH_3Br in fumigation chambers*

(A) Steel lined chamber. Unit 1, sampling rate=2.40 liters/min. Volume of air samples=12 liters.

		Mg. CH_3Br found	Percent recovery of theoretical	Concentration found mg./liter
Run 1	Bubbler 1	372.97	97.1	
	Bubbler 2	8.44	2.2	31.7
			99.3	
Run 2	Bubbler 1	346.33	90.2	
	Bubbler 2	16.20	4.3	30.1
			94.5	
Run 3	Bubbler 1	399.86	104.1	
	Bubbler 2	6.00	1.6	33.8
			105.7	
		Theoretical concentration		32.0

(B) Tests of units sampling simultaneously. Theoretical concentration not known because of rapid leakage from concrete chamber.
Unit 1, sampling rate 2.40 liters/min. All samples 5 min.=12 liters.
Unit 2, sampling rate 2.45 liters/min. All samples 5 min.=12.3 liters.

			Mg. CH_3Br found	Concentration mg. CH_3Br/liter
Run 4	Unit 1	Bubbler 1	335.6	28.7
		Bubbler 2	9.2	
	Unit 2	Bubbler 1	340.5	28.5
		Bubbler 2	9.7	
Run 5	Unit 1	Bubbler 1	302.6	25.2
		Bubbler 2	Trace	
	Unit 2	Bubbler 1	322.0	26.4
		Bubbler 2	Trace	
Run 6	Unit 1	Bubbler 1	58.2	4.9
		Bubbler 2	None	
	Unit 2	Bubbler 1	58.2	4.7
		Bubbler 2	None	

DISCUSSION

The apparatus described is an outgrowth of several years' application of many modifications of this basic design. At air flows of less than 2 liters per minute a considerably longer time is required to obtain sufficient amounts of halogen for satisfactory analysis. The sintered glass foot type of bubbler has been found to be an efficient gas scrubber under most conditions at flows less than 3 liters per minute. Likewise, the simplicity of design of these bubblers makes rinsing out of the absorbing fluids more efficient.

The combustion method of converting the organic halides to a form which may be readily determined by inorganic procedure makes impossible a simple determination of the separate components of mixed halogenated hydrocarbons, especially when two or more chlorine compounds are being used in solvent mixtures. In rare instances bromine and chlorine compounds may be used as solvents

so that various chemical methods could be instituted with the bubbler solutions to determine separately these two ions.

The flow meters were calibrated for one rate of flow and during sampling were adjusted by means of by-pass needle valves in the suction lines so that the manometer liquid (water) remained at the calibration markings. The volume of air passing through the apparatus was determined from the calibrated flow and the length of sampling, timed with a stop watch.

The rubber connections used in this apparatus deteriorate rather rapidly owing to the heat from the electrical resistance and therefore must be replaced at frequent intervals. Ground glass connections were tried in order to overcome this difficulty but unequal thermal expansion caused opening of the connections so that leaks were unavoidable.

In preparing the unit for shipment, the bubblers and manometer tube were packed in separate containers. The manometer tube was filled with colored water before sampling was begun.

Samples at ceiling level may be obtained by connecting glass tubing to the intake with the unit remaining at a convenient working height.

SUMMARY

A portable unit for the thermal decomposition and determination of halogenated hydrocarbons in air is described in detail. Analysis of standard samples indicates that, at a sampling rate of 2.5 liters per minute, recovery of carbon tetrachloride and trichlorethylene is quantitative.

REFERENCES

(1) Olsen, J. C., Smyth, Henry F., Jr., Ferguson, George E., and Scheflan, Leopold: Determination of the concentration of vaporized carbon tetrachloride. J. Ind. Eng. Chem., Anal. Ed., **8**: 260–263 (1936).
(2) Tebbens, B. D.: Portable combustion apparatus for field determinations of chlorinated hydrocarbons. J. Ind. Hyg. and Toxicol., **19**: 204–211 (1937).

COURT DECISION ON PUBLIC HEALTH

Order of State stream control commission requiring city to construct sewers and sewage treatment plant upheld.—(Michigan Supreme Court; *City of Niles* v. *Stream Control Commission*, 296 N.W. 713; decided March 11, 1941.) Acting under the provisions of the law creating it the Stream Control Commission of Michigan ordered the city of Niles to construct sewers and an approved sewage treatment plant. This order followed unsuccessful endeavors by the commission to have the city take care of its sewage. The statute authorized the commission to make regulations and orders restricting the polluting

content of any waste material or polluting substance discharged or sought to be discharged into any lake, river, stream, or other waters of the State and also authorized the commission to take all appropriate steps to prevent any pollution which was deemed by it to be unreasonable and against public interest in view of the existing conditions in any lake, river, stream, or other waters of the State. The city challenged the order of the commission as being unreasonable in view of the unusual conditions existing in the St. Joseph River on which the city was located and into which it was discharging untreated sewage. The unusual conditions complained of were the large deposits of industrial waste and sewage discharged by certain Indiana cities and universities into the St. Joseph River immediately before it entered Niles.

The supreme court, in holding that the order in question was not arbitrary or unreasonable, said that, in order to stop pollution of the river, it was necessary for the commission to take action against the city of Niles inasmuch as it was the first city in the State, on the course of the river, below the Indiana cities and thus open the way for suit to compel the Indiana cities to stop pollution of the waters of the river. "It is an instance where the State must clean up its own door yard before being in a position to ask or seek to compel its neighbor to clean up." This, according to the court, was not an arbitrary exercise of power by the commission but a practical movement toward accomplishment of a most desirable end.

DEATHS DURING WEEK ENDED APRIL 26, 1941

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Apr. 26, 1941	Corresponding week, 1940
Data from 88 large cities of the United States:		
Total deaths	8,308	8,484
Average for 3 prior years	8,551	
Total deaths, first 17 weeks of year	157,961	158,255
Deaths per 1,000 population, first 17 weeks of year, annual rate	13.0	13.0
Deaths under 1 year of age	539	504
Average for 3 prior years	507	
Deaths under 1 year of age, first 17 weeks of year	9,143	8,702
Data from industrial insurance companies:		
Policies in force	64,547,387	65,664,534
Number of death claims	12,510	13,544
Death claims per 1,000 policies in force, annual rate	10.1	10.8
Death claims per 1,000 policies, first 17 weeks of year, annual rate	10.6	10.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED MAY 3, 1941

Summary

An abrupt decline was recorded in the incidence of measles, from 50,609 cases for the preceding week to 43,880 for the current week. Decreases were reported in all geographic areas except the West South Central and Mountain. The Middle Atlantic, East North Central, and South Atlantic areas have had predominantly the highest incidence rates during the present epidemic. To date this year (first 18 weeks) a total of 583,263 cases of measles has been reported as compared with 586,012 for the corresponding period in 1938.

The number of reported cases of poliomyelitis increased from 16 to 20, as compared with the preceding week. Michigan, with 6 cases, reported the largest number, and Kentucky and California were next with 3 cases each. The total number of cases reported to date this year, 424, is slightly below the number reported for the corresponding period last year, 427. The highest incidence this year has been recorded for the East North Central and South Atlantic States. In the latter area, Florida has reported 46 of the 103 cases, of which 30 cases occurred in Dade County.

The current incidence of diphtheria, meningococcus meningitis, scarlet fever, smallpox, and typhoid fever is below the 5-year (1936–40) median expectancy.

Of 69 cases of smallpox, 41 cases, or approximately 60 percent, were reported in the two North Central areas, 17 cases occurring in Missouri and 6 each in Indiana and Michigan. Fifteen cases were reported in Oregon but no cases in the other two Pacific States (Washington and California).

Eight cases of Rocky Mountain spotted fever were reported in the Mountain States and 1 case was reported in Virginia. Of 12 cases of endemic typhus fever, 4 were reported in Alabama and 3 in Texas.

The death rate for the current week in 88 major cities of the United States was 11.6 per 1,000 population, the same as for last week. This is only slightly above the 3-year (1938–40) average of 11.5. The cumulative rate for the first 18 weeks (annual basis) is 12.9, the same as for the corresponding period of last year.

Telegraphic morbidity reports from State health officers for the week ended May 3, 1941, and comparison with corresponding week of 1940 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended—		Median, 1936–40	Week ended—		Median, 1936–40	Week ended—		Median, 1936–40	Week ended—		Median, 1936–40
	May 3, 1941	May 4, 1940		May 3, 1941	May 4, 1940		May 3, 1941	May 4, 1940		May 3, 1941	May 4, 1940	
NEW. ENG.												
Maine	0	1	1	3	1	2	199	566	177	0	0	0
New Hampshire	0	0	0	----	----	----	89	0	50	1	0	0
Vermont	1	0	0	----	----	----	72	2	44	0	0	0
Massachusetts	1	0	5	----	----	----	975	566	683	1	2	2
Rhode Island	2	0	0	2	----	----	3	200	66	0	1	1
Connecticut	1	3	5	1	8	3	302	76	167	0	1	0
MID. ATL.												
New York	19	12	39	[1] 5	[1] 16	[1] 7	5,619	713	2,181	7	7	7
New Jersey	2	4	7	6	6	6	2,698	786	786	1	1	3
Pennsylvania	19	23	33	----	----	----	5,624	445	1,135	1	5	5
E. NO. CEN.												
Ohio	16	3	23	9	26	11	4,638	19	527	3	0	2
Indiana	6	9	5	13	10	11	1,066	17	19	0	0	1
Illinois	22	18	25	11	13	38	2,148	121	121	1	1	3
Michigan [2]	3	2	8	2	12	3	3,503	629	584	1	1	1
Wisconsin	0	0	1	37	38	56	1,873	680	680	0	1	1
W. NO. CEN.												
Minnesota	3	1	2	2	5	2	25	116	254	0	0	3
Iowa	2	5	2	3	----	2	218	191	191	0	0	0
Missouri	3	7	4	----	5	24	633	23	20	0	2	1
North Dakota	1	1	1	6	2	3	31	4	4	0	0	0
South Dakota	0	1	1	----	1	1	14	5	5	1	3	0
Nebraska	0	0	1	----	----	----	12	24	76	0	0	0
Kansas	4	1	2	8	7	4	990	653	62	1	0	1
SO. ATL.												
Delaware	0	0	0	----	----	----	158	0	10	0	0	0
Maryland [2]	2	7	6	3	6	8	403	3	292	3	0	2
Dist. of Col	0	0	2	----	----	----	299	3	103	0	0	1
Virginia [2]	5	4	9	109	110	110	1,518	196	458	3	3	8
West Virginia [2]	2	7	7	15	41	41	753	60	60	0	1	3
North Carolina [4]	13	11	11	3	10	30	1,792	100	152	2	2	2
South Carolina	5	5	5	270	400	223	987	25	55	1	0	1
Georgia [4]	5	3	3	58	38	----	717	148	111	0	1	1
Florida	0	1	2	61	1	2	468	220	209	0	0	1
E. SO. CEN.												
Kentucky	2	4	4	4	12	16	1,025	95	95	3	3	7
Tennessee	1	2	4	27	16	74	565	190	84	1	1	1
Alabama [4]	5	5	5	22	45	174	626	63	63	0	1	3
Mississippi [2]	5	2	5	----	----	----	----	----	----	1	0	1
W. SO. CEN.												
Arkansas [4]	0	3	4	75	58	66	370	20	20	0	0	0
Louisiana [4]	2	2	9	3	14	16	47	6	52	0	2	2
Oklahoma	7	2	6	61	80	80	148	25	79	0	2	3
Texas [4]	28	33	30	729	372	372	1,541	1,120	584	0	2	2
MOUNTAIN												
Montana [2]	2	2	2	----	16	16	51	90	35	0	0	0
Idaho	0	0	0	----	----	1	10	22	29	0	0	0
Wyoming [2]	0	0	1	----	----	----	34	52	25	0	0	0
Colorado [2]	11	15	10	18	10	----	636	51	51	0	1	0
New Mexico	0	0	1	1	----	1	246	36	38	0	0	0
Arizona	1	1	1	124	109	50	98	104	104	0	1	0
Utah [2]	4	0	0	13	----	----	29	694	77	0	0	0
Nevada	0	----	----	----	----	----	2	----	----	0	----	----
PACIFIC												
Washington	2	0	1	14	----	----	44	712	399	0	0	1
Oregon	3	4	0	20	9	28	226	591	88	1	1	0
California	8	11	28	312	35	36	355	259	686	0	1	1
Total	218	215	346	2,050	1,532	1,532	43,880	10,721	13,129	33	47	64
18 weeks	5,045	6,185	8,872	584,614	160,776	141,425	583,263	127,341	167,826	886	738	1,480

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended May 3, 1941, and comparison with corresponding week of 1940 and 5-year median—Continued

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended—		Median, 1936–40	Week ended—		Median, 1936–40	Week ended—		Median, 1936–40	Week ended—		Median, 1936–40
	May 3, 1941	May 4, 1940		May 3, 1941	May 4, 1940		May 3, 1941	May 4, 1940		May 3, 1941	May 4, 1940	
NEW ENG.												
Maine	0	0	0	4	15	18	0	0	0	0	1	1
New Hampshire	0	0	0	1	4	4	0	0	0	0	0	0
Vermont	0	0	0	12	4	5	0	0	0	0	0	0
Massachusetts	0	0	0	196	151	251	0	0	0	5	10	1
Rhode Island	0	0	0	5	12	12	0	0	0	0	0	0
Connecticut	0	0	0	76	93	84	0	0	0	2	0	0
MID. ATL.												
New York	0	0	2	507	1,100	910	0	0	0	6	5	6
New Jersey	0	0	0	294	383	223	0	0	0	3	3	4
Pennsylvania	0	1	1	377	495	495	0	0	0	7	7	7
E. NO. CEN.												
Ohio	2	1	1	296	325	325	1	0	0	3	24	9
Indiana	1	0	0	103	114	150	6	6	23	0	8	1
Illinois	0	0	0	287	800	618	2	2	7	4	2	2
Michigan [3]	6	0	0	285	356	374	6	1	3	3	0	1
Wisconsin	0	0	0	92	122	206	3	1	3	1	0	0
W. NO. CEN.												
Minnesota	0	1	0	44	84	132	2	2	10	0	0	0
Iowa	0	0	0	40	53	141	2	13	36	1	2	2
Missouri	0	0	0	141	73	192	17	3	19	0	1	2
North Dakota	0	0	0	3	9	15	1	7	7	2	0	1
South Dakota	0	0	0	19	15	15	1	1	18	0	0	0
Nebraska	0	0	0	29	6	23	0	4	4	0	0	0
Kansas	0	1	0	46	61	98	0	0	7	1	3	1
SO. ATL.												
Delaware	0	0	0	17	9	8	0	0	0	0	0	0
Maryland [3]	0	1	0	40	33	53	0	0	0	0	2	2
Dist. of Col	0	0	0	13	35	20	0	0	0	2	1	1
Virginia [3]	0	0	0	12	63	31	0	0	0	0	2	2
West Virginia [3]	[5] 0	0	0	41	41	41	0	0	0	2	8	7
North Carolina [4]	0	1	1	23	36	21	0	2	0	0	0	0
South Carolina	0	0	0	7	3	2	0	0	0	3	4	3
Georgia [4]	0	0	0	15	13	12	1	0	0	7	2	5
Florida	1	0	1	1	3	6	0	0	0	3	1	2
E. SO. CEN.												
Kentucky	3	0	0	108	83	38	0	0	0	10	5	4
Tennessee	1	0	0	66	85	27	0	0	0	4	2	3
Alabama [4]	0	0	1	12	12	4	0	11	1	1	1	2
Mississippi [3]	0	0	0	1	10	6	4	1	1	1	1	1
W. SO. CEN.												
Arkansas [4]	1	0	1	5	1	3	0	2	0	2	5	3
Louisiana [4]	0	0	0	4	6	8	0	0	0	2	2	7
Oklahoma	0	1	1	24	18	20	0	12	12	0	3	3
Texas [4]	2	2	1	43	26	73	3	18	14	6	3	10
MOUNTAIN												
Montana [3]	0	0	0	24	31	21	0	0	8	2	1	1
Idaho	0	0	0	5	5	10	0	0	3	1	0	0
Wyoming [3]	0	0	0	3	9	11	0	0	2	0	0	0
Colorado [3]	0	2	0	29	30	37	0	4	4	1	0	0
New Mexico	0	0	0	6	7	11	0	0	0	0	1	1
Arizona	0	0	0	4	6	11	5	0	0	0	0	1
Utah [3]	0	0	0	13	7	11	0	0	0	2	0	0
Nevada	0	----	----	0	----	----	0	----	----	0	----	----
PACIFIC												
Washington	0	0	0	15	48	34	0	0	8	0	1	1
Oregon	0	0	0	16	13	26	15	4	12	1	0	0
California	3	2	2	126	122	174	0	1	11	5	4	5
Total	20	13	13	3,530	5,030	5,030	69	95	252	93	115	125
18 weeks	[6] 424	427	359	66,760	86,787	105,200	821	1,332	5,737	1,375	1,461	1,990

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended May 3, 1941, and comparison with corresponding week of 1940—Continued

Division and State	Whooping cough	
	Week ended—	
	May 3, 1941	May 4, 1940
NEW ENG.		
Maine	8	26
New Hampshire	28	11
Vermont	11	35
Massachusetts	225	166
Rhode Island	21	17
Connecticut	73	11
MID. ATL.		
New York	285	279
New Jersey	116	124
Pennsylvania	334	350
E. NO. CEN.		
Ohio	404	173
Indiana	47	27
Illinois	91	98
Michigan [2]	440	157
Wisconsin	94	143
W. NO. CEN.		
Minnesota	103	18
Iowa	55	38
Missouri	56	11
North Dakota	36	7
South Dakota	23	1
Nebraska	17	9
Kansas	146	40
SO. ATL.		
Delaware	5	17
Maryland [2]	88	142
Dist. of Col	14	4
Virginia [3]	96	32
West Virginia [5]	67	33
North Carolina [4]	291	67
South Carolina	165	27
Georgia [4]	20	21
Florida	26	7
E. SO. CEN.		
Kentucky	99	123
Tennessee	42	47
Alabama [4]	47	35
Mississippi [2]		
W. SO. CEN.		
Arkansas [4]	27	30
Louisiana [4]	3	13
Oklahoma	33	37
Texas [4]	339	291
MOUNTAIN		
Montana [2]	19	0
Idaho	3	3
Wyoming [2]	1	4
Colorado [3]	217	4
New Mexico	7	50
Arizona	43	11
Utah [2]	98	153
Nevada	0	
PACIFIC		
Washington	153	64
Oregon	27	20
California	658	354
Total	5,201	3,330
18 weeks	80,034	55,202

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended May 3, 1941, 9 cases, as follows: Virginia, 1; Montana, 3; Wyoming, 1; Colorado, 4.
[4] Typhus fever, week ended May 3, 1941, 12 cases, as follows: North Carolina, 1; Georgia, 1; Alabama, 4; Arkansas, 1; Louisiana, 2; Texas, 3.
[5] Information has been received that diagnosis was changed in 1 of 2 cases of poliomyelitis in West Virginia published in the PUBLIC HEALTH REPORTS of Apr. 25, 1941, p. 918.

WEEKLY REPORTS FROM CITIES

City reports for week ended April 19, 1941

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	115	194	67	5,233	652	2,084	20	385	20	1,212	----
Current week	59	130	51	16,520	429	1,357	0	332	8	1,267	----
Maine:											
Portland	1	----	0	1	3	0	0	0	0	9	18
New Hampshire:											
Concord	0	----	0	11	0	0	0	0	0	0	14
Manchester	0	----	0	0	0	3	0	2	0	0	12
Nashua	0	----	0	0	0	0	0	0	0	0	10
Vermont:											
Barre	0	----	0	0	0	0	0	2	0	0	2
Burlington	0	----	0	3	0	0	0	0	0	0	8
Rutland	0	----	0	0	0	0	0	0	0	0	2
Massachusetts:											
Boston	0	----	0	290	12	66	0	10	0	36	220
Fall River	1	----	0	3	0	10	0	1	0	3	45
Springfield	0	----	0	24	0	16	0	0	0	1	34
Worcester	1	----	0	31	4	7	0	1	0	6	42
Rhode Island:											
Pawtucket	0	----	0	1	0	1	0	0	0	0	15
Providence	0	1	0	3	1	2	0	1	0	10	57
Connecticut:											
Bridgeport	0	1	1	15	4	5	0	0	0	5	57
Hartford	0	----	0	4	3	3	0	0	0	4	32
New Haven	0	----	1	1	1	22	0	0	0	4	36
New York:											
Buffalo	0	----	2	106	5	30	0	3	0	12	150
New York	13	16	4	5,146	82	295	0	69	1	65	1,519
Rochester	0	----	0	254	5	2	0	0	0	33	62
Syracuse	0	----	0	0	6	2	0	1	0	22	60
New Jersey:											
Camden	0	2	2	42	3	23	0	0	0	0	35
Newark	0	1	0	184	8	36	0	5	0	14	115
Trenton	0	1	0	52	1	39	0	0	0	0	40
Pennsylvania:											
Philadelphia	0	1	0	1,391	31	124	0	24	2	60	557
Pittsburgh	1	3	4	791	16	15	0	4	0	59	191
Reading	0	----	0	95	1	1	0	1	0	1	27
Scranton	0	----	----	34	----	1	0	----	0	0	----
Ohio:											
Cincinnati	1	1	0	297	2	17	0	8	0	2	130
Cleveland	3	6	3	528	17	60	0	8	0	62	196
Columbus	0	1	1	246	4	13	0	1	0	22	85
Toledo	0	----	0	403	6	4	0	3	0	23	90
Indiana:											
Anderson	0	----	0	27	0	0	0	0	0	0	10
Fort Wayne	0	----	0	44	0	1	0	1	0	6	28
Indianapolis	3	----	0	672	10	20	0	2	0	22	119
Muncie	1	----	0	78	0	13	0	0	0	0	16
South Bend	0	----	0	45	1	1	0	0	0	0	18
Terre Haute	0	----	0	5	3	0	0	0	0	0	23
Illinois:											
Alton	0	----	0	6	2	1	0	0	0	0	12
Chicago	15	3	2	1,093	38	162	0	30	1	32	747
Elgin	0	----	0	129	0	3	0	0	0	0	5
Moline	0	----	0	37	0	1	0	0	0	0	10
Springfield	0	----	0	6	1	6	0	0	0	0	20
Michigan:											
Detroit	1	----	0	922	8	99	0	7	1	96	282
Flint	0	----	0	167	4	5	0	0	0	6	26
Grand Rapids	0	1	0	549	2	7	0	0	0	3	29
Wisconsin:											
Kenosha	0	----	0	168	0	0	0	0	0	0	7
Madison	0	----	0	36	2	14	0	0	0	1	6
Milwaukee	0	2	2	641	3	26	0	3	0	33	100
Racine	0	----	0	38	1	6	0	0	0	2	11
Superior	0	----	0	1	0	4	0	0	0	5	8

City reports for week ended April 19, 1941—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Minnesota:											
Duluth	0	----	0	0	1	1	0	0	0	24	26
Minneapolis	2	----	1	9	2	15	0	3	0	49	115
St. Paul	0	1	1	4	7	2	0	1	0	21	85
Iowa:											
Cedar Rapids	0	----	----	12	----	1	0	----	0	0	----
Davenport	0	----	----	6	----	5	0	----	0	0	----
Des Moines	1	----	----	9	----	4	0	----	0	0	31
Sioux City	0	----	----	4	----	1	0	----	0	8	----
Waterloo	0	----	----	48	----	1	0	----	0	0	----
Missouri:											
Kansas City	0	----	0	130	4	7	0	2	0	10	107
St. Joseph	0	----	0	22	5	0	0	0	0	2	20
St. Louis	0	6	2	306	9	73	0	8	0	33	214
North Dakota:											
Fargo	0	----	1	2	0	1	0	0	0	15	8
Grand Forks	0	----	----	0	----	0	0	----	0	0	----
Minot	1	----	----	16	----	2	0	----	0	1	5
South Dakota:											
Aberdeen	0	----	----	1	----	0	0	----	0	0	----
Sioux Falls	0	----	----	0	----	5	0	----	0	0	9
Nebraska:											
Lincoln	1	----	----	1	----	3	0	----	0	0	----
Omaha	3	----	0	2	6	3	0	1	0	1	51
Kansas:											
Lawrence	0	----	0	24	0	2	0	0	0	0	----
Topeka	0	----	0	232	2	3	0	0	0	22	13
Wichita	1	----	0	5	6	3	0	0	0	16	31
Delaware:											
Wilmington	0	----	0	70	1	2	0	0	0	0	38
Maryland:											
Baltimore	0	3	2	156	18	18	0	10	0	45	240
Cumberland	0	----	0	4	1	1	0	0	0	4	11
Frederick	0	----	0	1	0	1	0	0	0	2	5
Dist. of Col.:											
Washington	0	3	1	346	8	14	0	19	1	13	176
Virginia:											
Lynchburg	1	----	0	6	1	0	0	0	0	0	10
Norfolk	0	9	0	282	6	1	0	0	0	0	35
Richmond	0	----	1	95	2	2	0	3	0	0	51
Roanoke	0	----	1	65	1	0	0	2	0	0	18
West Virginia:											
Charleston	0	1	0	1	3	0	0	1	0	0	36
Huntington	0	----	----	287	----	0	0	----	0	4	----
Wheeling	0	----	0	42	0	3	0	0	0	1	20
North Carolina:											
Gastonia	0	----	0	45	----	0	0	----	0	6	----
Raleigh	0	----	0	87	1	0	0	0	0	28	12
Wilmington	0	----	0	0	1	1	0	0	0	19	10
Winston-Salem	0	----	0	39	1	1	0	2	0	12	18
South Carolina:											
Charleston	0	7	0	44	1	0	0	1	0	1	21
Florence	0	----	0	0	0	0	0	0	0	0	9
Greenville	0	----	0	35	1	0	0	1	0	28	12
Georgia:											
Atlanta	0	1	1	45	3	0	0	7	0	1	76
Brunswick	0	----	0	61	2	0	0	0	0	0	6
Savannah	0	15	3	28	1	2	0	2	0	11	36
Florida:											
Miami	0	2	0	21	2	2	0	2	0	9	45
St. Petersburg	0	----	1	49	4	1	0	0	0	0	25
Tampa	0	----	0	2	0	0	0	0	0	4	25
Kentucky:											
Ashland	0	----	1	1	0	0	0	2	0	1	10
Covington	0	----	0	15	1	1	0	0	0	0	11
Lexington	0	----	0	12	0	0	0	1	0	2	17
Louisville	0	----	0	862	2	46	0	6	0	13	70
Tennessee:											
Knoxville	1	----	0	84	2	7	0	0	0	7	18
Memphis	0	3	1	101	2	4	0	7	0	20	81
Nashville	0	----	1	116	6	3	0	2	0	9	43
Alabama:											
Birmingham	1	10	0	130	3	3	0	2	0	0	67
Mobile	0	1	0	3	0	0	0	1	0	0	21
Montgomery	0	----	----	35	----	0	0	----	0	1	----
Arkansas:											
Fort Smith	0	----	----	89	----	0	0	----	0	2	----
Little Rock	0	3	0	4	2	2	0	1	0	3	15

City reports for week ended April 19, 1941—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Louisiana:											
Lake Charles	1		0	0	0	0	0	0	0	1	4
New Orleans	1	3	2	13	12	4	0	9	0	8	142
Shreveport	0		0	4	2	0	0	4	0	1	35
Oklahoma:											
Oklahoma City	0	1	1	5	3	3	0	2	1	0	48
Tulsa	0		0	63	1	0	0	0	0	12	11
Texas:											
Dallas	2		0	41	4	4	0	6	1	6	57
Fort Worth	1		1	78	1	5	0	2	0	1	32
Galveston	0		0	4	1	0	0	1	0	0	28
Houston	2	3	2	0	2	6	0	6	1	0	61
San Antonio	0	4	2	1	6	0	0	10	0	1	62
Montana:											
Billings	0		0	0	1	1	0	0	0	1	11
Great Falls	0		0	0	1	0	0	1	0	0	14
Helena	0		0	1	0	1	0	0	0	0	2
Missoula	0	1	1	0	0	1	0	0	0	0	6
Idaho:											
Boise	0		0	9	1	1	0	0	0	0	6
Colorado:											
Colorado Springs	0		0	3	1	3	0	0	0	5	12
Denver	5	9	1	332	3	1	0	7	0	88	80
Pueblo	0		0	5	1	0	0	2	0	26	13
New Mexico:											
Albuquerque	0	1	1	32	0	2	0	3	0	0	13
Arizona:											
Phoenix	0	29		7		0	0		0	2	
Utah:											
Salt Lake City	0		0	5	1	2	0	1	0	7	52
Washington:											
Seattle	1		3	0	1	2	0	1	0	18	77
Spokane	0		0	8	4	2	0	1	0	0	40
Tacoma	0		0	3	0	1	0	0	0	6	22
Oregon:											
Portland	1		0	17	3	0	0	0	0	2	62
Salem	0			1		2	0		0	3	
California:											
Los Angeles	0	14	1	51	3	35	0	13	0	46	326
Sacramento	0		0	6	1	0	0	0	0	39	33
San Francisco	0	2	1	13	5	6	0	13	0	19	187

State and city	Meningitis, meningococcus		Poliomyelitis cases	State and city	Meningitis, meningococcus		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				Maryland:			
Boston	1	0	0	Baltimore	4	1	0
New York:				District of Columbia:			
New York	1	0	0	Washington	1	0	0
New Jersey:				South Carolina:			
Camden	1	0	0	Charleston	1	0	0
Pennsylvania:				Kentucky:			
Philadelphia	2	0	0	Louisville	1	0	0
Scranton	2	1	0	Louisiana:			
Michigan:				Shreveport	0	1	0
Detroit	2	0	0	Texas:			
Missouri:				Dallas	1	0	0
St. Louis	1	0	0	Houston	1	1	0

Encephalitis, epidemic or lethargic.—Cases: Springfield, Ill., 1. Deaths: New York, 2.
Pellagra.—Cases: Trenton, 1; Philadelphia, 1; Savannah, 1; New Orleans, 1; Houston, 1; San Antonio, 1.
Rabies in man.—Deaths: Cincinnati, 1.
Typhus fever.—Cases: New York, 2; St. Petersburg, 1; New Orleans, 1.

TERRITORIES AND POSSESSIONS

VIRGIN ISLANDS OF THE UNITED STATES

Notifiable diseases—January–March 1941.—During the months of January, February, and March 1941, cases of certain notifiable diseases were reported in the Virgin Islands of the United States as follows:

Disease	January	February	March	Disease	January	February	March
Filariasis	6	5	----	Schistosomiasis	1	----	----
Gonorrhea	13	14	16	Syphilis	20	15	20
Hookworm disease	5	5	5	Tuberculosis	2	3	2
Malaria	2	3	5				

FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended March 29, 1941.—During the week ended March 29, 1941, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	2	5	----	3	18	2	----	3	2	35
Chickenpox	1	1	----	152	193	36	15	47	74	519
Diphtheria	1	19	----	25	1	2	----	----	----	48
Dysentery	----	----	----	1	----	----	----	----	----	1
Influenza	1	45	----	----	2	----	----	----	13	61
Measles	8	185	15	316	1,278	70	167	222	1,071	3,332
Mumps	----	----	----	346	399	24	22	19	30	840
Pneumonia	4	22	----	----	6	----	----	----	6	38
Scarlet fever	----	26	2	167	215	17	3	11	21	462
Tuberculosis	3	10	6	55	74	25	----	----	----	173
Typhoid and paratyphoid fever	8	1	1	12	3	----	----	----	2	27
Whooping cough	----	----	----	93	147	1	7	9	22	279

JAMAICA

Communicable diseases—4 weeks ended April 12, 1941.—During the 4 weeks ended April 12, 1941, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chickenpox	7	34	Scarlet fever	1	----
Diphtheria	4	4	Tuberculosis	46	86
Dysentery	5	5	Typhoid fever	7	41
Leprosy	1	2			

YUGOSLAVIA

Notifiable diseases—4 weeks ended February 23, 1941.—During the 4 weeks ended February 23, 1941, certain notifiable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	8	----	Paratyphoid fever	6	1
Cerebrospinal meningitis	191	39	Poliomyelitis	10	----
Diphtheria and croup	479	28	Scarlet fever	252	2
Dysentery	36	4	Sepsis	4	1
Erysipelas	143	6	Tetanus	9	6
Favus	8	----	Typhoid fever	303	21
Lethargic encephalitis	2	2	Typhus fever	58	10

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—A cumulative table giving current information regarding the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS of April 25, 1941, pages 924–928. A similar table will appear in future issues of the PUBLIC HEALTH REPORTS for the last Friday of each month.

Smallpox

Cuba—Santiago de Cuba.—During the week ended April 5, 1941, 1 case of smallpox was reported in Santiago de Cuba.

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